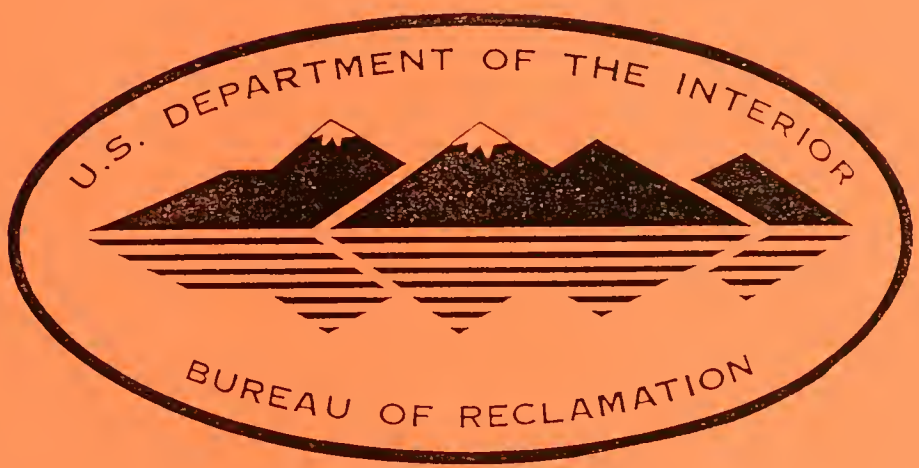
Water Management Planning in the Central Valley Project



Developed to Meet the 1996 Standard Criteria for Evaluating Water Management Plans

December 1997

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CRITERIA FOR EVALUATING
WATER MANAGEMENT PLANS

FINAL

U.S. Bureau of Reclamation, Mid-Pacific Region
Criteria for Evaluating Water Management Plans

September 1996

These "Criteria for Evaluating Water Management Plans" (Criteria) were developed by the US Bureau of Reclamation (Reclamation) in response to the Central Valley Improvement Act of 1992 (CVPIA) and in accordance with the Reclamation Reform Act of 1982 (RRA).

All agencies (Districts) that contract with Reclamation for Municipal & Industrial (M&I) water in excess of 2,000 acre feet and/or for Agricultural (irrigation) water to serve over 2,000 irrigable acres will be evaluated based on the required information detailed in the steps listed below. The steps are:

1. Describe the District
2. Inventory Water Resources Available to the District
3. Best Management Practices (BMPs) for Agricultural Contractors
   a. Non-exemptible BMPs
   b. Exemptible BMPs
4. Best Management Practices for Urban Contractors
   a. Non-exemptible BMPs
   b. Exemptible BMPs
5. Exemption Process

If some data called for in the Criteria are not available, the District shall include in its plan how the District will gather the data and have it available for the next plan update.

BACKGROUND AND GENERAL INFORMATION

Section 210 of the RRA requires districts with certain types of Bureau of Reclamation contracts to prepare and submit Water Management Plans (Plans) with definite goals, appropriate water conservation measures, and timetables. "Guidelines" for preparing these Plans were prepared and are updated by Reclamation, Mid-Pacific Region every 5 years. Districts were asked to submit updated Plans every 5 years to reflect the specifics in the revised Guidelines.

Section 3405 (e) of the CVPIA requires that the Secretary of the Interior establish criteria to evaluate Plans by April 30, 1993, and that these Criteria be reviewed and revised, if necessary, at least every 3 years.

This law specifies that the Criteria identify best management practices (BMPs) including, but not limited to, efficient water management practices being developed according to California State law or reasonable alternatives. In addition, the Criteria are to grant substantial deference to the recommendations included in *A Management Plan for Agricultural Subsurface Drainage and Related Problems on the Westside San Joaquin Valley (September 1990).*

Reclamation has been unable to wait for a conclusion to the California Agricultural/Public Interest Group Task Force consensus discussions (instituted by Assembly Bill 3616) before issuing and revising these Criteria but has incorporated the majority of the current AB 3616 language. Consensus BMPs for urban water districts (resulting from an Urban/Public Interest Group Task Force) were incorporated into these Criteria in 1993. When the Criteria are updated, Reclamation will consider modifications to reflect future consensus reached between agricultural, urban and environmental and public interest groups.

PROCESS TO DEVELOP THE CRITERIA

The purpose of these Criteria is to promote the highest level of water use efficiency reasonable achievable by project contractors using best available cost-effective technology and best management practices.

The revision of the 1993 Criteria began on September 12, 1995, when Reclamation sent the Criteria to the interested public for review and comment. On the basis of oral and written comments, Reclamation's experience with administering the Criteria, and comments from the CVPIA Public Forum Water Conservation Workteam, Reclamation proposed changes to the April 1993 Criteria.

Draft Revised Criteria were distributed to more than one thousand interested parties in March 1996. Reclamation received written comments from twenty representatives of water user and public interest groups; Reclamation received oral comments at three public workshops, with forty-one participants. Reclamation met with members of the Central Valley Project Public Forum Conservation Workteam (Workteam) to discuss the draft revised Criteria.

Major concerns expressed in written and oral comments, and by the Workteam included: consistency with the AB 3616 draft MOU, the degree of measurement required by the Criteria, the nature of pricing required by the Criteria, and the possibility of regional Criteria. Other significant concerns included: conditioning discretionary benefits on Plan development and implementation, accommodation of the *Management Plan for Agricultural Subsurface Drainage and Related Problems on the Westside San Joaquin Valley (September 1990)*, and the inclusion of groundwater management plans. The current resolution of these concerns is reflected in this second draft revised Criteria. If you would like a complete copy of the comments and Reclamation responses, please contact the Water Conservation Program Manager at (916) 979 - 2388 (TDD (916) 979-2310).

Reclamation is releasing these revised Criteria while it works to develop a proposal for regional Criteria, first for the Sacramento Valley region and later for other regions if it appears warranted. Reclamation will work with concerned districts, public interest groups, stakeholders and the public to determine what regional Criteria might be appropriate.

Annual Updates for districts that developed Plans under the 1993 Criteria will conform to the revised Criteria. Implementation of BMPs that were eliminated or moved to Attachment A in the revised Criteria will no longer be formally reviewed by Reclamation.

As used in these Criteria, "water conservation" means:

Improved water management through the implementation of best management practices.

Although the term "Best Management Practice" has been used in various statutes and regulations, the

definitions and interpretations of that term in those statutes and regulations do not apply to these Criteria. For the purposes of these Criteria, "Best Management Practice" means:

A policy, program, practice, rule, regulation and/or ordinance, or the use of devices, equipment or facilities which meets either of the following items:

1. An established and generally accepted practice among water districts that results in more efficient use, conservation or management of water;
2. A practice for which sufficient data are available from existing water management projects to indicate that significant efficiency improvements or management related benefits can be achieved; that the practice is technically and economically reasonable and not socially or environmentally unacceptable; and that the practice is not otherwise unreasonable for most water districts to carry out.

Reclamation recognizes that these Criteria call for plans that are more detailed than those required before passage of the CVPIA. To assist districts in developing adequate water conservation plans, Reclamation's Mid-Pacific Region area offices have Water Conservation technical staff that are aware of and familiar with local and area specific issues. Water Conservation staff are current with technical advancements and familiar with programs implemented within all regions of the State. Since the Criteria were developed in 1993, over half of CVP contractors above the threshold of 2,000 acre feet for M & I contractors or 2,000 irrigable acres for agricultural contractors have developed and implemented plans that meet this Criteria.

Reclamation developed and distributed a Guidebook for Developing Water Management Plans detailing the type of information required by the 1993 Criteria. This Guidebook will be updated to conform to the revised Criteria.

BENEFITS OF WATER MANAGEMENT PLANNING

Planning for water management programs offers the opportunity for districts to coordinate efforts and think about the best ways to implement programs before making any capital expenditures. Comprehensive planning allows all affected parties - end users, District Board members and staff - to be on the same path to accomplish the same goals. Some districts have chosen to use these plans as a business plan, as a way to identify long range activities and develop a stable program base.

Water Transfers

Water transfers may have, in some instances, a substantial part to play in good water management. Some Districts have found that they can market water as a way to provide funding for water management programs.

Water transfers are legally recognized as a beneficial use of water. The CVPIA authorizes the transfer of water outside of the CVP service area, subject to certain conditions, creating opportunities not previously available to CVP contractors. In February 1993 Reclamation issued "Guidelines for Implementation of Water Transfers," available upon request, that outline the procedures for water transfers within and outside of the CVP service area.

Flexibility

These Criteria recognize the differences between districts and have been written to be flexible enough to allow each district to develop and implement the types of programs that will best accomplish improved water management within their boundaries. In some cases, districts may choose to pool resources and implement joint programs. These Criteria not only allow, but encourage, joint efforts toward program implementation.

Plan Implementation

Water management in general, and water management planning in particular, is an on-going process that does not stop with the preparation of a comprehensive Plan. The purpose of preparing a Plan is for Districts to implement the programs developed during the planning process. Implementation of programs identified in the Plan is critical to the success of water management within a District. These Criteria focus not only on what constitutes an adequate Plan, but also on the implementation of the programs described in that Plan. Districts shall report on Plan implementation annually.

Consequences of Non-Compliance

Reclamation policy is to condition the granting of contract renewals on the development and good-faith implementation of an adequate Water Management Plan. Because development and implementation of a Water Management Plan is an important tool for the evaluation of proposals for water transfers, Reclamation encourages that Plans be in place for Districts wishing to transfer water to other entities.

Review Process

Districts that submit three copies of a complete plan or complete revisions will receive, within 90 days, notification of Reclamation acceptance or request for modification.

Step 1. Describe the District

Intent:

To describe general physical information about the District in order to form a basis for evaluating improvements by, and within, the District, as well as provide the reader with information about physical aspects of the District that may effect the potential for improved water management.

Evaluation:

Reclamation recognizes that in certain circumstances, specific information may not be available. In these circumstances, the step will be considered "adequately addressed" if the plan describes how the information will be obtained for the next plan update.

Detail Expected in an Adequate Plan:

Water Management Plans shall describe the District history, location and facilities, size, terrain and soils, environment, climate, operating rules and regulations, customer water delivery measurements, water rate schedules and billing, and water shortage allocation policies. For data not available during the preparation of this plan, the District shall describe how the information will be obtained for the next Plan update.

A. History: Give an historical overview of the District. Provide a timeline which includes the formation of the District, original size, water supplies, contract information with Reclamation and others, and changes in land use. For agricultural contractors, describe changes in irrigated acreages, cropping patterns, and evolving irrigation methods.

B. Location and Facilities: Describe the water conveyance and delivery system within the District service area (e.g., unlined canals, lined canals, pipelines, etc.), storage facilities (e.g., reservoirs, regulating reservoirs, etc.). Agricultural Districts should describe spill recovery systems, and whether the delivery system is on-demand (no lead time or scheduling necessary), scheduled (i.e., order water 24 hours in advance), rotation (farmer receives water every 10 days), or other. Describe any restrictions on the District's water source(s) and proposed changes that will be implemented in the next five years.

C. Topography and Soils: Describe the topography of the District (e.g., hilly, flat, sloping to a water course, etc.). Indicate the impact of topography on water operations and management within the District. Districts with agricultural contracts over 2,000 irrigable acres, describe major soil classifications and corresponding acreages within the District's boundaries. Describe any soil limitations that affect the use of water (e.g., salinity or high water table, extremely sandy soils, low infiltration rates, etc.).

D. Climate: Describe the general climate of the District. Include average precipitation, maximum and minimum temperatures, average wind velocity and direction and frost free days. If, within the District, there are known areas with significantly different microclimates, describe how these affect water management decisions and operations.

E. Natural and Cultural Resources: Describe any known natural resources (e.g., wetlands, rivers, streams, lakes, fisheries, threatened plant and animal communities, spawning grounds, flyways, etc.) within the District boundaries. Indicate any management of these resources in the past or present by the District. Describe any known recreational and/or cultural resources within the District.

F. Operating Rules and Regulations: Describe or attach a copy of the District's operating rules and regulations. Agricultural contractors should include information on water allocation policies, lead time necessary for water orders and water shut-off, any policies regarding return flows and drainage leaving the District, and policies related to water transfers into or out of the District (farmer and District).

G. Water Measurement, Pricing and Billing: List the total number of connections/ turn-outs, the number currently measured and the percentage of customer water deliveries measured. List the types and numbers of measurement devices (e.g., meters, calibrated gates, weirs, etc.), level of accuracy, frequency of calibration, and maintenance and reading schedule.

Describe the basis for water charges for agricultural, municipal and industrial uses. A copy of the District's written operating rules and regulations will suffice if they include: basis for water charges for agriculture (e.g., by quantity, by acre, by crop, by land assessment, by other charges, etc.) and/or for municipal and industrial (e.g., by customer class, by quantity, flat rate, etc.).

If water use is billed by quantity describe the rate structure (e.g., declining, uniform or increasing block rate, etc.). Include the billing frequency (e.g., monthly, bimonthly, annually, etc.), bill format and a description of the record management system.

H. Water Shortage Allocation Policies: Attach a copy of the District's agricultural and/or urban water shortage policies.

Agricultural Districts shall describe how reduced water supplies. including hardship water, are allocated. Describe District policies that address wasteful use of agricultural water and describe enforcement methods.

Step 2. Inventory Water Resources

Intent:

To describe the quantity and quality of water resources (sources, uses, and discharges) available to the District in order to form a basis for evaluating improvements by and within the District, and to provide the reader with an understanding of water available to the District, water used within the District, and water discharged from the District.

Evaluation:

Reclamation recognizes that in certain circumstances, specific information may not be available. For these circumstances, the step will be considered "adequately addressed" if the plan describes how the information will be obtained for the next plan update.

Detail Expected in an Adequate Plan:

This step shall include a description of the District's surface water supply, ground water supply, other water supplies, source water quality monitoring programs, water uses within the District, agricultural drainage from the District, urban waste water disposal, and a water inventory. Provide this information for 1996. For data not available during the preparation of this plan, the District shall describe how the information will be obtained for the next plan update.

A. Surface Water Supply: Describe the acre-foot amounts delivered to the District by each of the District's surface sources for the specified years. Describe any water quality limitations or management concerns associated with the identified water sources. Provide the amount of water received under each right and/or contract for the last 10 years.

B. Ground Water Supply: Describe the general characteristics of the ground water basin(s) that underlie the District. Provide a map locating District operated water wells, and managed ground water recharge areas. If there is conjunctive use of surface and ground water, describe it. For managed ground water basins, attach a copy of the management plan.

C. Other Water Supplies: Identify any long-term water supplies not described above (e.g., drainage from upstream Districts, reclaimed urban waste water, transfer agreements with adjacent or other Districts, etc.).

D. Source Water Quality Monitoring Practices: Describe any surface water or ground water quality problems, and how the quality problems limit the use of the water or affect customer use decisions. If water quality problems exist, describe the water quality testing program (frequency of measuring and analyses performed) and which agencies conduct the water testing. Also describe the District's role in the program.

E. Water Uses within the District

1. Agricultural: Describe the type and acreage of crops grown in the District; include evapotranspiration rates, cultural practices and the leaching requirement for each crop. List the types of irrigation systems used for each crop.

2. Municipal and Industrial: Describe the municipal and industrial water use, by customer type, within the District. Describe, where applicable, the waste water collection and treatment systems, recycled water uses and methods of disposal.

3. Ground Water Recharge: List the quantity of water used for planned and incidental ground water recharge, including method of recharge.

4. Transfers and Exchanges: Describe the source and quantity of water that was transferred and/or exchanged into or out of or within the District, and for what uses. Describe any other water transactions, such as trades, wheeling, etc.

5. Other: Describe any other uses of water.

F. Agricultural Drainage from the District: Identify where surface and subsurface agricultural drainage goes (e.g., to beneficial reuse within the service area, discharged to a river or other water course, another District, saline sink, evaporation ponds, wildlife refuge, etc.). If drainage leaves the District's service area and is reused, identify the location and type of that reuse, if known. Describe any water quality monitoring programs for surface or subsurface drainage water (frequency of measuring and analyses performed). Identify any constituents (e.g., selenium, pesticides, etc.) that limit reuse of the drainage water. Describe any usage limitation resulting from the drainage water quality.

Section 3405 (c) states that "the contracting district or agency shall be responsible for compliance with all applicable State and Federal water quality standards applicable to surface and subsurface agricultural drainage discharges generated within its boundaries." Districts included in the drainage problem area, as identified in *A Management Plan for Agricultural Subsurface Drainage and Related Problems on the Westside San Joaquin Valley (September 1990),* should also complete Attachment A.

G. Water Accounting: Develop a water inventory for the District based on 1996.

1. *Quantify District Water Supplies*
   a. Surface water supplies, imported and originating within District, by month.
   b. Ground water extracted by the District, by month.
   c. Effective precipitation by month.
   d. Estimated ground water extracted by non-District parties (if records are not available, provide an estimate and basis for estimation).
   e. Recycled water by month (water originating from a municipal waste water treatment plant).
   f. Other supplies by month.

2. *Quantify Water Used*
   a. Conveyance losses, including seepage, evaporation, and operational spills.
   b. Consumptive use by riparian vegetation.
   c. Applied agricultural water, crop evapotranspiration, water used for leaching and cultural practices (e.g., frost protection, soil reclamation, etc.)
   d. Municipal and industrial water use.
   e. Ground water recharge.
   f. Water exchanges and transfers.
   g. Estimated deep percolation within the District.
   h. Flows to perched water table or saline sink.
   i. Total M&I waste water treated and discharged.
   j. Agricultural spill or drain water leaving the District.
   k. Other.

3. *Overall Water Inventory:* Compare total water supplies entering the District with total water leaving the District.

Step 3. Best Management Practices for Agricultural Contractors

Intent:

To develop an implementation plan for agricultural Best Management Practices (BMPs) that have been proven to accomplish improved (more efficient) water management.

Evaluation:

Some BMPs are considered "universally applicable" and others are considered "generally applicable." Reclamation recognizes that, under certain circumstances, the generally applicable practices may not make sense for District implementation. Districts will implement each generally applicable BMP unless the District provides adequate documentation for an exemption.

Detail Expected in an Adequate Plan:

For the purposes of these Criteria, the plan needs to describe the program that the District determines will best accomplish each BMP. The success of some of the practices will depend on cooperative work with other entities. There may be constraints to successful implementation of planned programs. Monitoring and updating will allow the District to modify planned programs that do not accomplish the practice as designed.

A. Critical Best Management Practices for Agricultural Contractors

This section lists the BMPs that all Districts will implement or are already implementing. Provide a description of the implementation plan and include time schedules, budgets and monitoring plans. Districts may spend time studying the most effective way to implement a BMP. If a BMP is to be studied, please provide details and schedules of the study.

1. **Measurement devices** - measure, with a device that is rated to have a maximum error of ± six percent, the volume of water delivered by the District to each customer (within five years of contract renewal or if no contract renewal date, by January 1, 1999);
2. **Pricing structure** - adopt a water pricing structure for District water users based at least in part on quantity delivered;
3. **Demand management staff** - designate staff responsible for development and implementation of the water management plan;
4. **Water management services for water users** - Provide or support the availability of the following water management services for water users:
   a. On-farm irrigation and drainage system evaluations (i.e., mobile labs)
   b. Normal year and real-time irrigation scheduling and crop ET information (i.e., CIMIS)
   c. Surface, ground and drainage water quantity and quality data;
   d. Educational programs and materials for farmers, staff, and public.

B. Exemptible Best Management Practices for Agricultural Contractors

Each District shall develop a program to implement the following BMPs unless the District demonstrates that the practice does not make sense for the District to implement. Districts may spend time studying the most effective way to implement a BMP or whether a BMP is appropriate for a District. For appropriate BMPs, provide a description of the implementation plan and include time schedules, budgets and monitoring plans. If a BMP is to be studied, provide details and schedules of the study. These studies must be completed expeditiously and before the next Plan update. Districts should follow the exemption criteria (see Step 5) to justify exemptions and provide the exemption in this Step. See Attachment B for examples of circumstances under which BMPs are not applicable.

1. **Distribution system lining/piping** - line or pipe distributions systems to increase distribution system flexibility and capacity, decrease maintenance and reduce seepage;
2. **Regulatory reservoirs** - construct regulatory reservoirs to improve distribution system delivery flexibility.
3. **Distribution control** - modify distribution facilities and controls to increase the reliability, consistency and flexibility of water deliveries;
4. **Reuse systems** - construct facilities to capture and reuse District operational spills;
5. **Incentive pricing** - implement a pricing structure, such as tiered-block pricing, which promotes one or more of the following goals: a) encouraging more efficient water use at the farm level, b) supporting planned conjunctive use of groundwater, c) increasing groundwater recharge, d) reducing problem drainage, and e) improved management of environmental resources;
6. **On-farm program incentives** - facilitate and/or provide financial incentives and assistance for improved on-farm water management;
7. **Conjunctive use** - increase planned conjunctive use of surface and groundwater within the District;
8. **Land management** - facilitate alternative uses for lands with exceptionally high water duties, or whose irrigation contributes to significant problems;

9. **Pump efficiency evaluations** - coordinate the evaluation of District and private pumps with local utilities, evaluating both energy and water efficiency;
10. **Operational practices and procedures** - evaluate potential District, state and federal policy and institutional changes that could allow more flexibility in water delivery and carry-over storage.

Step 4. Best Management Practices for Municipal and Industrial Contractors

Intent:

To develop an implementation plan for urban Best Management Practices (BMPs) that have been proven to accomplish improved (more efficient) water management.

Evaluation:

Some BMPs are considered "universally applicable" and others are considered "generally applicable." Reclamation recognizes that, under certain circumstances, the generally applicable practices may not make sense for District implementation. Districts will implement each generally applicable BMP unless the District provides adequate documentation for an exemption.

Detail Expected in an Adequate Plan:

This part of the plan identifies District-specific programs to accomplish the BMPs. It is understood that programs developed by wholesale agencies may not be implemented at the retail customer level, except within the District's retail service area. For the purposes of these Criteria, the plan needs to describe the program that the District thinks will best accomplish the practice. The development and implementation of the BMPs in a wholesaler's plan is the responsibility of Reclamation's contractor.

The success of some of the practices will depend on cooperative work with other entities. It is recognized that there may be constraints to successful implementation of planned programs. Monitoring and updating will allow the District to modify any planned programs that do not accomplish the practice as designed.

A. Critical Best Management Practices for Municipal and Industrial Contractors

This section lists the BMPs that all Districts will implement or are already implementing. Provide a description of the implementation plan and include time schedules, budgets and monitoring plans. Each District shall also complete and submit the California Urban Water Conservation Council annual report form. If a BMP is to be studied please provide details and schedules of the study.

1. **Distribution system water audits, leak detection and repair**
2. **Metering with commodity rates for all new and existing connections**
3. **Landscape efficiency requirements for new/existing commercial, industrial, institutional, governmental and multi-residential developments.**
4. **Public information**
5. **School education**
6. **New commercial, industrial and institutional water use review**
7. **Conservation pricing - water and sewer service**
8. **Water waste prohibition**
9. **Demand management staff**
10. **Financial incentives**

B. Exemptible Best Management Practices for Municipal and Industrial Contractors

Each District shall develop a program to implement the following BMPs unless the District demonstrates that the practice does not make sense for the District to implement. Districts may spend time studying the most effective way to implement a BMP or whether a BMP is appropriate for a District. For appropriate BMPs, provide a description of the implementation plan and include time schedules, budgets and monitoring plans. If a BMP is to be studied, provide details and schedules of the study. These studies must be completed expeditiously and before the next Plan update. Districts should follow the exemption criteria (see Step 5) to justify exemptions and provide the exemption in this Step. See Attachment B for examples of circumstances under which BMPs are not applicable.

1. **Interior and exterior water audits and incentive programs for single family residential, multi family residential, and governmental/institutional customers**
2. **Plumbing, new & retrofit**
3. **Large landscape water audits and incentives**
4. **Commercial, industrial and institutional conservation**
5. **Landscape water conservation for new and existing single family homes**
6. **Ultra low flush toilet installation program**

Step 5. Exemption Process

Intent:

To demonstrate in a clear and concise manner that a BMP is either not cost-effective, not financially feasible, not legal or not environmentally possible for a District to implement.

Evaluation:

These Criteria recognize that some BMPs are not appropriate or possible for some Districts to implement. To document an exemption provide the basis, rationale, and details for excluding a BMP; such documentation shall address, as appropriate, cost-effectiveness, financial feasibility, and environmental or legal constraints to BMP implementation. Reclamation will consider exemption requests prepared using the final AB-3616 exemption process.

Detail Expected in an Adequate Plan:

LEGAL CONSTRAINTS

In order to justify a BMP exemption because it would not be legal for the District to implement, detail the following:

1. A list of any known laws, regulations, court decisions, or other legal constraints that make it illegal for the District to implement the BMP; and
2. A list of the steps that would be required to remove these constraints; and
3. A description of what steps the District has taken to remove these constraints; and
4. Documentation of efforts by the District to work with other entities that would have the legal authority to carry out the BMP within the District's service area.

ENVIRONMENTAL CONSTRAINTS

In order to justify an exemption due to known adverse environmental impacts, the Plan must document the critical environmental issues and known (qualitative and/or quantitative) negative impacts of the BMP and an explanation of why effective mitigation of these impacts is not possible. If mitigation of the environmental impacts is possible, the practice must be implemented unless it can be exempted by another exemption category. For example, if the mitigation costs make the project economically infeasible, a discussion of the mitigation plan and necessary mitigation costs should be included as a part of the economic analysis.

ECONOMIC CONSTRAINTS

In order to justify an exemption due to economic constraints, the Plan must document the following:

1. A benefit-cost analysis which demonstrates that the costs to the District outweigh the benefits to the District over the life of the measure. Districts must perform the analysis by comparing the present value of all benefits to the present value of all costs. Document the projected/estimated benefits and costs and the methodology for analysis (benefits and costs should be quantified to the extent possible). The analysis performed for each excluded BMP (from the District perspective) must include, but is not limited to, the following benefits and costs:

Benefits

- All capital costs avoided by the District which include, but are not limited to, the costs associated with the development of new supplies (e.g., studies, construction, labor, etc.), transportation, and the required increase in storage, distribution capacity, and wastewater facilities and treatment capacity, etc.,
- Operation and maintenance costs associated with the decrease in the production and distribution of water or the treatment and disposal of wastewater which include, but are not limited to, energy, labor, treatment, storage, drainage treatment and disposal, etc.,
- Water purchases avoided by the District,
- Environmental costs avoided by the District,
- Environmental enhancements,
- Revenues from other entities which include, but are not limited to, revenue from the sale of water made available by the BMP, financial incentives received from other entities, etc.,
- Other benefits to the District customers which include, but are not limited to, hydropower, improved crop yields, improved crop quality, labor savings, fertilizer savings, increased farm income, etc..

Costs

- Capital expenditures incurred by the District for implementation of the BMP which include, but are not limited to, equipment, supplies, materials, construction, etc.,
- Operation and maintenance costs to plan, design, implement, enforce, and evaluate the practice,
- Financial incentives to customers,
- Losses in revenues,
- Costs to the environment, and
- Other costs to the District.

Several accepted benefit-cost analysis methodologies exist (e.g., California Energy Commission's Integrated Resource Planning Methodology, generally accepted accounting principles, etc.). Districts are considered to be the best suited to evaluate their own economic situation with an appropriate methodology.

2. A discussion and quantification, to the extent possible, of other benefits associated with the implementation of the BMP that may be of interest to potential partners, but are not the direct sole responsibility of the District.

FINANCIAL CONSTRAINTS

In order to adequately justify an exemption due to financial constraints, the Plan must clearly document the following:

1. The benefits and costs of the BMP to the District; and
2. The District funding needed to implement the cost-effective BMPs; and
3. A discussion regarding why the District cannot finance the BMP through rate adjustments, assessments, etc.; and
4. A discussion of the District's reasonable efforts to secure funding from other entities which include, but are not limited to, lending institutions and bonding authorities and an explanation of why these entities would not provide funding; and
5. The required amount of a grant or subsidy that would be needed to feasibly implement the BMP if financing or partnerships could not be obtained.

Attachment A
Information required of Districts located in the drainage problem area

District's included in the drainage problem area, as identified in *A Management Plan for Agricultural Subsurface Drainage and Related Problems on the Westside San Joaquin Valley (September 1990),* are listed, by sub-area, below. If future editions of the drainage report revise the boundaries of the drainage problem area or other factors used to determine which districts are in the drainage problem area, Reclamation will revise Attachment A to conform with the current drainage report.

1. Reclamation districts in the **Grasslands Subarea**: Broadview WD, Central California ID, Del Puerto WD, Firebaugh Canal WD, Mercy Springs WD, Pacheco WD, Panoche WD, San Luis Canal Company, San Luis WD.

2. Reclamation districts in the **Westlands Subarea**: James ID, Tranquillity ID and Westlands WD.

3. Reclamation districts in the **Tulare Subarea**: Alpaugh ID, Atwell Island WD, Lower Tule River ID, and Pixley ID.

4. Reclamation districts in the **Kern Subarea**: Alpaugh ID.

Districts listed above shall describe which recommendations prescribed in *A Management Plan for Agricultural Subsurface Drainage and Related Problems on the Westside San Joaquin Valley (September 1990)* have been incorporated in their water conservation programs to improve conditions in drainage problem areas. These recommendations include:

1. Source Control
2. Land Retirement
3. Drainage Water Treatment
4. Drainage Water Reuse
5. Shallow Groundwater Pumping
6. Evaporation Ponds

Provide a description and level of expenditure for each activity designed to address the recommendations of the San Joaquin Valley Drainage Program. Identify how implementation of the recommendations has or will substantially reduce deep percolation on drainage problem lands. Describe which recommendations have not been implemented and why.

Attachment B
Non-Applicability (N/A) of Exemptible BMPs

To establish that a BMP is not applicable to the District, the Plan should explain the reasons why the BMP does not apply to the District. This justification must be consistent with Step 1 of the Criteria titled, "Describe the District." Examples of non-applicability for each exemptible BMP are listed below. This list is not all inclusive.

Step 3, B. Exemptible Best Management Practices for Agricultural Contractors

1. **Distribution system lining/piping** - NA could include: completely piped systems, unlined systems or sections of systems which are used as part of a planned conjunctive use program;
2. **Regulatory reservoirs** - NA could include: completely piped systems which do not have delivery constraints;
3. **Distribution control** - NA could include: completely piped systems which do not have delivery constraints;
4. **Reuse systems** - NA could include: completely piped systems which do not have delivery constraints;
5. **Incentive pricing** - None identified;
6. **On-farm program incentives** - None identified;
7. **Conjunctive use** - NA could include: districts which do not overlie a useable ground water basin and thus neither the district nor its customers pump or use ground water;
8. **Land management** - NA could include: districts without irrigable lands that have exceptionally high water duties or whose irrigation does not contribute to significant problems;
9. **Crop & field** - NA could include: districts where are least 50 percent of the customers irrigate crops with non-district water;
10. **Pump efficiency evaluations** - NA could include: districts where neither the district nor its customers use ground water pumps, lift pumps, pressure pumps, filter pumps, etc.;
11. **Operational practices and procedures** - None identified.

Step 4, B. Exemptible Best Management Practices for Municipal and Industrial Contractors

1. **Interior and exterior water audits and incentive programs for single family residential, multifamily residential, and governmental/institutional customers** - None identified.
2. **Plumbing, new & retrofit** - NA could include: districts which supply water only to structures which have no plumbing fixtures or supply water only for exterior uses.
3. **Large landscape water audits and incentives** - NA could include: districts which do not supply water to any landscape of three acres or more.
4. **Commercial, industrial and institutional conservation** - NA could include: districts which provide water only to residential customers.
5. **Landscape water conservation for new and existing single family** homes - NA could include: districts which provide no water to residential customers.
6. **Ultra low flush toilet replacement** - None identified

WATER MANAGEMENT PLANNING
GUIDEBOOK

A Guidebook for Preparing USBR CVPIA Water Management Plans

The Bureau of Reclamation, Mid-Pacific Region developed this Guidebook to assist water districts prepare water management plans. The Guidebook is designed for districts of all sizes and complexities that provide either municipal and industrial water, or agricultural water, or both.

The Guidebook is designed to support Reclamation's overall water management mission. Reclamation works cooperatively with others to improve water resource management and the efficiency of water use throughout the western United States. This Guidebook also supports Reclamation's responsibility under the Central Valley Project Improvement Act of 1992, Section 3405 (e). However, the methods and measures described in the Guidebook are more broadly aimed at helping districts improve their overall water management. Improved water management will often lead to better water conservation. We encourage you to take this broader view as you use this Guidebook.

This Guidebook contains explanatory information and definitions related to the Criteria for Evaluating Water Conservation Plans, September 1996 (Criteria). The items in bold faced type are section headings from the Criteria. Details on what information to include in a plan are included in the Plan Format (Plan-on-Disk), available from your USBR area office staff.
Completion of this Plan requires a significant amount of data, some of which may not currently be available. When data is not available at the District or from other sources, use a best estimate or state that the data is not available and that estimates are not appropriate. Data which is available from federal, state, county and municipal agencies should be included in the Plan. USBR area office staff are available to assist in data acquisition from these sources. If actual data is not available, include a data acquisition plan with a schedule that will result in the data being available for the five-year plan update (unless it is historical data which will never be available.

If a part of the Plan is not appropriate (NA) for the District, mark that section of the Plan with an NA.

This Guidebook is designed to assist managers and staff of agricultural and municipal and industrial water districts to improve water management at the District level and by the individual customer.

To the urban user, good water management means using sufficient water to maintain or improve quality of life. This can often be accomplished while reducing the amount of water used.

To the farmer, good water management means getting the right amount of water to the crops at the right time with minimum labor and expense. This should be accomplished without creating other problems, such as a build-up of salt in the soil, or losing water to spills and seepage.

To the water district, good water management means meeting the water needs of its customers as efficiently as possible, with minimum waste or loss. Good water management is therefore fundamentally important to good overall district management.

To society, good water management means having an adequate supply of good quality water for all environmental, municipal, industrial, agricultural, and recreational needs. Those in charge of operating water supply and delivery systems bear the responsibility for promoting and achieving the good water management demanded by society.

BENEFITS OF GOOD WATER MANAGEMENT PLANNING

Planning is the process of thinking ahead to achieve desired future outcomes and to avoid future

problems. It is something we all do at many levels every day of our lives. There are benefits to be gained and risks to be avoided by water management planning.

Water management planning can benefit the water district and their customers, as well as third parties and the environment. The range of potential benefits includes:

- Better water service to customers
- More effective use of available water supply
- Reduced operating costs and improved revenues
- Improved water quality
- Reduced treatment costs
- Reduced customer costs
- Improved aquatic habitat
- Reduced drainage costs
- Habitat maintenance for endangered species
- Better documentation of uses and accomplishments
- Education of customers and others
- Improved system and water supply reliability
- Postponed need for new or expanded water supplies
- Reduced drought impacts

PROBLEMS AVOIDED BY GOOD WATER MANAGEMENT PLANNING

There are a variety of problems that can be avoided by good water management planning. Some of these could affect the District and its customers immediately and others could pose future threats. Some examples of undesirable situations that might be avoided through good planning are:

- Daily and seasonal water shortages
- Excessive losses or spills from water delivery systems
- Insufficient carry-over supplies in reservoirs
- Loss of water rights through waste or abandonment
- Adverse relationships with other water users and publics
- Drainage and erosion control problems
- De-watered streams and wetlands

THE IMPORTANCE OF PUBLIC INVOLVEMENT

A basic principle of planning is that it cannot be done effectively in a vacuum. It would be shortsighted to develop new policies, procedures, or requirements and attempt to implement them without involving

the people affected by them. In many cases, district or state laws prohibit such actions.

For plans to be credible and effective, it is important to obtain consensus and support from the District board of directors and other potentially affected parties. The parties that are most affected by water management measures are district customers. Involving customers throughout the Planning process is more likely to produce a management plan that addresses real problems in practical ways.

There are other important 'publics' that make significant contributions to plan development. Involve community leaders, state and federal agency staff, and representatives of various interest groups in the Planning process. A broad perspective on issues will help avoid obstacles to plan implementation.

HOW WILL PUBLIC COMMENTS REGARDING THE USBR "NOTICE OF DRAFT DECISION" BE SOLICITED?

After a district submits an adopted final Water Conservation Plan, USBR will publish, in the *Federal Register*, a "Notice of Draft Decision", based on USBR review of the adopted final plan. There will be a minimum 30 day public comment period and all comments must be submitted in writing to USBR by the designated deadline.

HOW WILL USBR USE THE INFORMATION RECEIVED DURING THE PUBLIC COMMENT PERIOD?

USBR will review and consider all written comments. Within 30 days of the close of the public comment period USBR will issue a final determination on the submitted Water Management Plan.

USBR will work with water districts whose plans are incomplete. The goal is to have an adequate Water Management Plan from every water contractor. Involving all parties in the plan development and review process will help avoid the submittal of negative public comments during the Federal Register process.

For these reasons, it is very important to consider public involvement as an integral part of the water management planning process. The goals of public involvement are:

- To build credibility by establishing an open and accessible planning and decision-making process
- To identify and understand the diverse concerns and values of the parties potentially affected by your decisions
- To develop a consensus among divergent interests in support of your water management plan

Some methods to provide public involvement opportunities include mail questionnaires and information sheets, public meetings and workshops, focus groups and advisory committees, and the use of local media. Reclamation has a substantial amount of experience in developing public involvement programs and has produced a *Public Involvement Manual* to assist water resource planners in this area (USDI, 1980). Additional assistance in developing a public involvement program can be obtained from the Water Conservation Coordinator at Reclamation's Area or Regional office nearest you.

WHAT IS THE RECOMMENDED LEVEL OF AGENCY AND PUBLIC PARTICIPATION?

As soon as an initial plan outline is prepared, meetings with city, county and special district staff should be arranged. Information from these local government agencies will be important to the accuracy and completeness of the Plan. Also, the perspective some of these agencies may bring to the Planning

process can provide the District with possible benefits of cooperation, funding, and political support.

Parts of the Plan need to describe Federal and State programs/regulations and will be better described by meeting with representatives of those agencies to get input. DWR staff can help to organize multi-district meetings with these agencies.

When the District has prepared a draft of a plan, the District should mail a notice of draft plan availability to all interested or affected parties. The following is suggested as a general contact list, but each district will need to determine the appropriate local agencies and groups.

Local governmental agencies, including:

- County Planning, Water, Health and Flood Control, and the Office of Emergency Services
- City Planning, Health, Water and Sewer Departments
- Special district Water and Sewer
- County Agricultural Commissioner and Cooperative Extension Farm Advisors
- Groundwater Replenishment or Recharge districts
- Resource Conservation district

State agencies, including:

- Regional Water Quality Control Board
- State Environmental Protection Agency
- Departments of Fish & Game, Health Services, Forestry, Water Resources, Food & Agriculture

Federal agencies, including:

- Department of Agriculture - National Resource Conservation Service (NRCS), and Forest Service (USFS).
- Department of Interior - Fish and Wildlife Service (FWS), Geological Service (USGS), and Bureau of Land Management (BLM).
- Department of Commerce - National Marine Fisheries Service
- Environmental Protection Agency
- Department of Energy - Western Area Power Administration
- U.S. Army Corps of Engineers

Citizen groups

- Chamber of Commerce
- Farm Bureau
- National environmental groups
- Local environmental groups

- Community or labor groups

Other

- Local representatives: US Congress and State Legislature
- Area utilities
- Any agencies or individuals involved in water transfers with the District
- All Joint-Powers Authorities and their signatories
- All pumpers in each groundwater basin, and, if applicable, the Water Master and parties to the adjudication

Draft plans should be provided to those so requesting. An announcement of the pre-adoption public hearing on the Plan, sent to the same list, will also ensure that the District encourages public involvement.

The plan adoption process will include a public comment period. It is recommended that an official transcript of oral comments, and copies of written comments, and the District's responses, be included as an attachment to the Plan.

Benefits of encouraging government agency and public participation in the development and review of the Plan include:

- development of mutual aid agreements
- development of water distribution system improvements which allow the transfer of water among cooperating districts
- information from the local planning departments. including regular reports on zoning changes. urban limits, growth projections, etc.
- community and special interest group support

WHEN SHOULD A DISTRICT CONSIDER PREPARING A COOPERATIVE PLAN?

A USBR water management plan can be developed either for a single water district or as a cooperative plan by two or more districts. In certain areas or at certain times, a cooperative plan may offer significant benefits to each involved district.

Examples of when a cooperative plan could be beneficial include:

- districts have similar soils, climates, or cropping patterns
- water management programs could be cooperatively funded or sponsored
- cooperative administration/management can provide substantial benefits
- cooperative plan preparation would provide an overall work reduction
- two or more districts receive water from a common source
- districts are located contiguous to, or near, each other
- districts are in the same watershed

- a user group has already been established
- drain water from one district is used by a downstream district

If a cooperative plan is prepared, it must contain the required specific information for each participating district and the Plan must be adopted and implemented by each participating district.

WHAT ARE THE BENEFITS OF PARTICIPATING IN A COOPERATIVE PLAN?

For plan preparation, several neighboring districts could cooperatively fund an individual or group to research and write the Plan and save a significant amount due to the efficiency of scale and commonalties of information.

Examples of effective cooperative plan implementation include:

- several districts planning the most effective method and location of recharging a common groundwater basin with Class II water so that all districts enjoy an improved water supply
- several smaller districts cooperatively funding a mobile lab so that the lab provides optimum service for the level of funding provided
- several districts cooperatively funding the piping of their supply ditch to provide more supply and improved scheduling

WHAT IF USBR PROVIDES ONLY A SMALL PART OF A DISTRICT'S WATER SUPPLIES?

The CVPIA only requires that water provided under Federal Contract be covered in the Water Management Plan. If a district has separate distribution systems for project and non-project water, it would be simple to prepare a Plan covering only project water. However, since the Plan is a water management document that most districts find helpful in many ways, it would be an unusual circumstance where a district would choose to limit the plan to only part of their operations.

WHAT INFORMATION DOES A DISTRICT HAVE TO PROVIDE IN THE ANNUAL UPDATE REPORT?

The Annual Update is provided each December to each district on a computer disk and contains the specific information the district provided in the previous Annual Update about projected BMP implementation. Districts provide information on the previous years actual BMP implementation activities (expenditures, staff time, activities, accomplishments, etc.) and project the coming years activities.

If Best Management Practice (BMP) information was tracked during the year, the form should not require more than a few hours to complete. All annual updates require similar information and the update process is simplified by collection of the BMP information throughout the year.

The computer format is provided to simplify the completion of the required Annual Update. If requested, USBR will provide the annual update on paper - it will contain the same information as the computer disk.

It is important to provide all the requested information. A complete Annual Update is an essential element of a district's contract obligations.

The Water Management Planning process described in this Guidebook consists of five Steps. The intent of this process is for each district to develop and implement a plan which provides optimal water management.

The process is structured to help a district design an appropriate water management program based on an assessment of the district's physical conditions, operations and policies, and water resources. This assessment is incorporated in Step 1, *Describe the District*, and Step 2, *Inventory Water Resources.*

Step 3 and Step 4 provides *Critical* and *Exemptible Best Management Practices* for Agricultural and Municipal & Industrial Contractors. This section assists the district in selecting the appropriate BMPs, level of implementation, time schedules and budgets, and monitoring plans. The *Critical* BMPs are identified as those practices that are the foundation of any successful water management program. The *Exemptible* BMPs may or may not be appropriate depending on the contractor's assessment and thus can be exempted from the plan.

Step 5, *Exemption Process*, describes the reasons and methods by which a district can exempt themselves from implementing a BMP. The four conditions which justify an exemptions are: cost-effectiveness, financial feasibility, environmental constraints, and legal constraints.

Step 1. Describe the District

If some data called for in the Criteria are not available, the District should include in its plan how the District will gather those data and have them available for the next plan update. If the missing data is historic data that cannot be recreated, state that in the Plan.

The Plan Format provides defined fill-in spaces for each of the elements listed below, greatly simplifying a district's Plan preparation and Reclamation's Plan review. Be sure to include data for 1996 in each section.

A. History

WHAT HISTORIC INFORMATION SHOULD THE PLAN INCLUDE?

An historic review of district development should include: date of district formation, original size in square miles, and how the size, population and irrigated acreage has changed over time. Also describe how the District's water supplies and water supply contracts have changed over time, and anticipated changes in water supplies and land use. Agricultural water supplies should describe current cropping patterns and irrigation methods and how they have changed over time.

WHAT IS MEANT BY "CONTRACT RESTRICTIONS?"

Restrictions on time of delivery or amount of water available per month impact a district's operations and should be described as fully as possible. The restrictions may explain why some best management practices may not be applicable, beneficial, feasible, or legal for a district.

WHAT ARE EXAMPLES OF ANTICIPATED LAND USE CHANGES?

Districts are not expected to predict every possible eventuality. Changes that are currently "in the works" should be addressed. Such changes might include annexing new lands, increasing urbanization, or the impact of CVPIA on the District.

B. Location and Facilities

HOW SHOULD A DISTRICT DESCRIBE ITS CONVEYANCE / DELIVERY SYSTEM?

A detailed descriptive map will enhance the narrative description of the water system. A district service area map should delineate whether the distribution lines are pipelines, lined or unlined canals or other; and the location of measuring devices, pumping stations, regulating reservoirs, etc..

Agricultural water suppliers should include information about what operational constraints the system imposes on water management. Examples of operational constraints include: receiving uncontrolled surface drainage from an upslope district with no control over quantity or timing, the inability to supply water as needed by the growers due to canal capacity, etc. Also include information on whether the delivery system provides immediate, scheduled, rotation, or other delivery method.

Include information on any proposed or planned changes to the District's facilities and/or operations for 1997-2002. Examples of changes to include are: expanded or reduced service area, lining/piping of existing canals, new operational system, etc.

WHAT KIND OF WATER SOURCE RESTRICTIONS SHOULD BE DESCRIBED?

Constraints that limit district water management and operations should be described. The limits would commonly be in the amount of water or time of use.

If the District does not have sufficient supply to meet all demand, discuss how this shortage developed.

C. Topography and Soils

WHAT ARE EXAMPLES OF TOPOGRAPHY IMPACTS?

Lower sections of a gravity piped water distribution system may have excessive pressure while upper portions of the system may have inadequate pressure for pressurized irrigation systems. Topography affects drainage capture and reuse.

WHERE CAN SOIL CLASSIFICATION INFORMATION BE OBTAINED?

The USDA Natural Resource Conservation Service (NRCS) (formally Soil Conservation Service) has soil survey information for most agricultural regions in California. Recent surveys (within the last twenty-five years) contain a single map called "General Soil Map". These generalized soil maps group soils into what are called Soil Associations and are appropriate for this plan. These soil groupings are made according to soil characteristic similarities such as texture, depth, salinity, slope, flooding potential, impervious layers, etc. The USBR soil classification system is not appropriate for this Plan.

HOW DOES A DISTRICT DETERMINE WHICH AREAS HAVE SOIL LIMITATIONS AFFECTING THE USE OF WATER?

District staff and customers will have knowledge of soil limitations and the resulting impacts on water management. Crops grown on poor soils may require more water than crops grown on good soils. Some poor-soil management problems may be overcome with better management or more water. If the District can identify terrain and soils that use more than average amounts of water, these areas can be targeted for improved management programs.

D. Climate

WHERE CAN A DISTRICT OBTAIN CLIMATE DATA?

If a district does not collect its own data, California DWR's California Irrigation Management System (CIMIS) and National Weather Service operate weather stations.

Where appropriate, relate climate to water use. Are there special climates in the District that require more (or less) water than other climates? In many respects, the impact of climate may be similar to the impacts of soils and terrain.

E. Natural and Cultural Resources

WHAT ARE NATURAL AND CULTURAL RESOURCES AND WHERE CAN INFORMATION BE OBTAINED?

Examples of natural resources are wetlands, vernal pools, streams, wildlife refuges and other areas. District staff should regularly work with the Fish and Wildlife Service, NRCS, U.S. Army Corps of Engineers, and the California Department of Fish and Game to identify natural resource areas and threatened and endangered species in the District.

Examples of cultural resources are archaeological and historal sites. Examples of recreational resources are sites used for rafting, water skiing and fishing. Recreation resources are identified by agencies such as state, regional, county and local park/recreation agencies, and local zoning agencies.

Identify natural, cultural and recreational resource enhancement opportunities. Also describe any natural, cultural or recreational resources that limit district operations. For example, if a canal cannot be lined because it would damage miles of fish habitat, describe.

F. Operating Rules and Regulations

WHICH OPERATING RULES AND REGULATIONS SHOULD BE INCLUDED?

All operating rules and regulations should be attached to the Plan. Describe any differences between actual operations and the official rules - such as water delivery orders being filled in 12 hours when the rules say 24 hours is the minimum. Discuss newly instituted policies, or those being considered for adoption, and what effect these policies may have on District projects.

G. Water Measurements and Accounting Procedures

Accurate water delivery measurement is an effective water management tool because both the water user and the District are made aware of quantity, timing and location of water use. Details on measurement device level of accuracy, frequency of calibration and/or maintenance and reading schedule shows the District's commitment to effective water management. Accurate water delivery measurement may improve the District's drainage reduction and irrigation efficiency management programs.

WATER ACCOUNTING PROCEDURES AND RECORD MANAGEMENT SYSTEMS

Record management systems include ledgers, card files, standard computer software, and district specific software. Describe the system and provide examples if appropriate. Accounting procedures document how easily customers may access their water use history and how many years of historic data are available to them.

WATER CHARGES AND BILLING PROCEDURE

Attach the District's rate schedules for raw, treated, and drainage water. Attach copies of actual bills and discuss how easy the bill is to understand and how it provides customers with current water use data, comparative yearly use data and pricing signals.

H. Water Shortage Allocation Policies

This part of the Plan can be completed by attaching a copy of the shortage allocation policy. For convenience, you may reference the appropriate part of the policy in the appropriate fill-in area of the Plan Format.

IF THE DISTRICT HAS NOT COMPLETED A WATER SHORTAGE CONTINGENCY PLAN

The USBR requires that districts with contracts for more than 2,000 acre-feet of M & I water, or which deliver more than 2,000 acre-feet of water that is used for M & I purposes, have a water shortage contingency plan. Plan development assistance is available from the California DWR, see Attachment A.

Step 2. Inventory Water Resources

Information developed in this section will culminate in a water resources inventory. A water resources inventory is a simplified water balance, quantifying how water comes into the District and how water is used within the District.

If some data called for in these Criteria are not available, the District should include in its plan how the District will gather those data and have them available for the next plan update. If the missing data is historic data that cannot be recreated, state that in the Plan.

A. Surface Water Supply

SHOULD THE PLAN DESCRIBE ONLY USBR SUPPLIES, OR ALL SURFACE WATER SUPPLIES USED BY THE DISTRICT?

All surface water supplies should be described and the point of diversion identified. The description should include the type of contract (Class I, Class II, Exchange, Agricultural, Municipal & Industrial, or other), when the contract began, and the amount of water delivered to the District by month and year. Not every district receives water that has been classified as Class I & II. Describe the "classes" of water defined in the District's USBR contract. This section can be completed by entering the requested information in Tables 1 and 8.

B. Ground Water

WHERE CAN A DISTRICT GET INFORMATION ON GROUND WATER BASINS?

California, DWR Bulletin 118-80 identifies ground water basins in California. Bulletin 118-80 describes the general boundaries of the basins, and indicates if there is evidence of overdraft. California districts can use this Bulletin to identify the basin, or basins, which underlie the District.

Large ground water basins may underlie several districts. In some cases, a district may overlie more than one ground water basin. The Plan should provide a map of the District and the extent of the ground water basin(s) within the District boundaries.

Districts should use the best available data. Data can be obtained from the California DWR, the U. S. Geological Survey and the United States Bureau of Reclamation.

WHAT CHARACTERISTICS OF A GROUND WATER BASIN SHOULD BE DESCRIBED?

Describe the general characteristics of each basin; include the:

- perennial yield (available from the USBR, 916-978-4902)
- sources of recharge (available from the USBR, 916-978-4902)
- the volume of water extracted by all users
- ground water quality
- recharge water quality

DWR reports, USGS Water Supply Papers and district records will also be helpful. If possible, estimate the proportion of recharge from stream flow, conveyance seepage and deep percolation. An estimate of basin ground water extraction can be obtained from the California DWR or can be estimated by the District. Use estimates if necessary.

Describe the District's planned conjunctive use program and complete the *Conjunctive Use Worksheet*, Attachment B. Examples of planned conjunctive use include: use of a Class II supply to recharged groundwater through stream channels, and agreements with neighboring districts to recharge Class II water in wet years, and return the water in drought years.

List district owned or operated ground water well and locate the wells on the map of the District. Location may be designated by: Township, Range and Section (from a USBR 7 1/2 minute quad map); latitude and longitude; or the Universal Transverse Mercator (UTM) method.

C. *Other Water Supplies*

WHAT OTHER SUPPLIES SHOULD BE DESCRIBED?

Surface and ground water supplies described previously might be only part of the water used within the District. Locally developed water supplies, surface drainage from upslope of the District, riparian rights, and long-term agreements for water transfers are other possible water supplies. To the extent possible, the supplies should be characterized as surface or ground water supplies.

D. *Source Water Quality Monitoring Practices*

WHERE DOES A DISTRICT GET WATER QUALITY DATA?

Surface water quality data may be available from the USBR, and the California DWR, or other agencies. Many districts have their own water quality programs.

If the District has a ground water quality monitoring program, the Plan should describe when and where water samples are collected, and results of analyses performed. If there are any known limitations on water use based on water quality, describe the water quality of that source, and the resulting limitations.

The Inland Surface Water Plan, required by the Central Valley Regional Water Quality Control Board, targets the quality of drain water. If the District is affected by this program, describe how the District is complying with the Inland Surface Water Plan.

E. *Water Uses within the District*

1. *Agricultural*

List the crops grown (use the crop list provided in Attachment C) in the District. For each crop, list the irrigated acres of the crop, crop evapotranspiration, leaching requirement, and water used for cultural practices. These values can be combined to give the total water demand for each crop. This section can be completed by entering the requested information in Table 5

WHERE CAN EVAPOTRANSPIRATION DATA BE OBTAINED?

Evapotranspiration requirements for crops in different areas can be found in: California DWR CIMIS Database, Bulletin 113-3 (April 1975); Oregon State University Miscellaneous Publication 8530 (1992); Nevada Department of Conservation and Natural Resources - Division of Water Planning Miscellaneous Publications; or obtained from local farm advisors. University of California Cooperative Extension can also provide information on crop ET, and water used for leaching and cultural practices.

HOW CAN THE DISTRICT COLLECT INFORMATION ON WHICH IRRIGATION METHODS ARE USED ON EACH CROP?

Some districts report to the USBR on crops grown. The district should identify the number of acres of different irrigation systems used on each crop. This can be collected at the time crop information is obtained, at the time water is requested for the year, or at the end of the year. Expanding an existing report will minimize district and customer cost and paperwork. Use the irrigation methods listed in Attachment C to complete this part of the Plan.

2. Municipal and Industrial

DOES EVERY DISTRICT HAVE TO DESCRIBE MUNICIPAL AND INDUSTRIAL USE OF WATER?

If the District supplies more than 2,000 AFY of raw or treated water to other purveyors, or directly to customers, that is used for municipal and industrial purposes, describe those uses of district water. If the District does not provide water for municipal and industrial uses, this section does not apply.

Quantify the municipal and industrial water use by major categories: single family residential, multifamily residential, commercial, industrial, institutional, landscape irrigation, wholesale, reclaimed and unaccounted (system losses).

Describe the waste water collection and treatment systems for the cities or towns. Include the level of treatment, quantity of water treated and method of disposal of treated water. If treated water is recycled or reused, describe the quantity of water recycled and how the recycled water is used.

3. Ground Water Recharge

If water is used for planned ground water recharge, describe the source of the water, the quantity of water and the method of recharge. Provide a map or description of the recharge basins/areas. Do not include incidental recharge, such as deep percolation resulting from excess irrigation.

4. Water Transfers

WHAT WATER TRANSFERS HAVE TO BE DESCRIBED?

Transfers refer to water exchanges, sales or other agreements that transfer or exchange water between water users, such as: 1) agriculture to M & I, 2) M & I to agriculture, 3) agriculture to agriculture, and 4) M & I to M & I.

If district water was transferred or exchanged, describe the quantity of water, the nature of the exchange, and the source of water used for the exchange. Exchanges include between and within district transfers. If the exchange resulted in increasing water supplies of the District, describe how the water was allocated and paid for. If District facilities were used to transfer private water, describe the nature of the exchange and the total quantity of water transferred.

5. Other

WHAT ARE EXAMPLES OF OTHER USES OF WATER?

If there were other uses of water not covered above, describe them (e.g. water for hydroelectric power, water used to meet water quality objectives, emergencies, etc.).

F. Drainage

HOW MUCH SPECIFICITY IS REQUIRED ON DOWNSTREAM DRAINAGE USE?

If surface drain water leaves the District's service area and is reused, identify the general location and type of that reuse, if known. If collected subsurface drain water leaves the District's service area and is reused, identify the general location and type of that reuse, if known. If surface and/or subsurface drain water is used within the District for agriculture, wildlife refuges, municipal and industrial, or other purposes, describe.

For example, if the District discharges surface return flows into the Sacramento River, the Plan should state that irrigation runoff and operational spills are returned to the Sacramento River. In this case, specific downstream uses would be unknown.

HOW MUCH SPECIFICITY IS REQUIRED FOR "USAGE LIMITATIONS" AND DRAINAGE WATER QUALITY?

A description of the constituents in the drain water (i.e., selenium, boron, etc.) and the resulting limitations should be described. For instance, excessive nitrates would limit the use of drain water for domestic consumption, but not for agricultural use. High salt concentrations may limit the use of surface drain water for agricultural use.

If a district does not have surface and/or subsurface drain water monitoring programs, the Plan should state how this information will be collected and monitored in the future.

If drainage from the District is regulated by a local, state or federal agencies, describe the nature and extent of the regulation. For example, the California State Water Resources Control Board may regulate point source discharges with a National Pollution Discharge Elimination System permit.

G. Water Accounting

WHAT IS A WATER ACCOUNTING?

See Glossary. The intent of the water accounting is for districts to quantify water supplies, uses and losses within the District.

The information necessary for the water accounting has been quantified in previous parts of the Plan. This section uses that information and arranges it in a water accounting (Table 6).

HOW ARE THE RESULTS OF A WATER ACCOUNTING USED?

Knowledge of the amount of water used for various purposes can lead to improved water management. A water inventory also identifies where a district lacks information. When analyzing best management practices, the water savings resulting from an individual practice can be estimated based on the water

inventory.

1. *Quantify district Water Supplies*

When completed this section will detail how much water the District receives from each source and the total water available.

a. All surface water supplies, imported and originating within the District, by month

Quantify in Table 1, to the extent possible, each of the surface water supplies.

Quantifying surface supplies by month will allow districts to show what supplies are used to meet water demands, and what supplies are used for ground water recharge.

b. Ground water extracted by the District, by month

Quantify in Table 2, to the extent possible, each of the District's ground water supplies.

c. Effective precipitation by month

See Glossary. A 1989 study by the California DWR found that the effective portion of precipitation varied within the state from a low of 25% to a high of 59%, with a state-wide average of 51% during the entire year. Local farm advisors may also have information on the effective precipitation amounts for the crops grown in your District. If effective precipitation cannot be estimated by month, estimate effective precipitation for the year. Enter this data in Table 3.

d. Estimated ground water extracted by non-district parties (if records are not available, provide an estimate and basis for estimation)

Metering of all ground water pumps is the most accurate way to measure total ground water used. Enter the (estimated) quantity of private groundwater pumping in Table 2.

Municipal and industrial water wells are usually metered and the information is generally available by contacting the pumpers. One method to estimate municipal water use is to use a per-person water use appropriate for the area (in California use DWR document *Urban Water Use, 1980-90*).

Private municipal groundwater pumping includes all non-district pumping within the District (cities, towns, commercial and industrial establishments, mines, etc.).

If the District does not have ground water production records for private agricultural groundwater pumpers, use the following method to estimate the quantity pumped:

1. add water needed for crop evapotranspiration
2. add water needed for leaching
3. subtract effective precipitation
4. result equals crop water need
5. divide by irrigation efficiency
6. result equals an estimate of applied water
7. subtract the amount of water delivered by the District
8. result equals the estimated amount of private ground water pumped

A similar method can be used to estimate the private M & I pumping.

e. Reclaimed water

Recycled water is treated urban wastewater that is treated and available for reuse. If reclaimed water is used within the District, quantify the volume and enter in Table 3.

f. Other water supplies

If other water is used within the District, quantify the volume and enter in Table 3.

2. Quantify Water Used

When completed this section will detail how water is used within the District.

a. Conveyance losses, include seepage, evaporation, operation spills and M&I leaks

Types of conveyance losses include seepage, evaporation, operational spills and municipal distribution system losses. Estimate the quantity of annual conveyance loss of each type and enter in Table 4. Describe how the values were determined or estimated.

Conveyance seepage is considered a loss of irrigation water and, sometimes, groundwater recharge. For example, when Class II water is available, conveyance seepage in some cases may be considered a ground water recharge method. However, when other water is conveyed, seepage results in losses of water intended for irrigation, increasing pumping costs and degrading water quality.

Practices that reduce seepage will help districts use water more efficiently, but may require new methods of percolating Class II water. Conveyance losses will not usually apply to Class II water.

b. Consumptive use by riparian vegetation

Estimate the annual consumptive water use by riparian vegetation not located at an environmental or recreational resource. Estimate the total acres of riparian vegetation and an overall use (based on ET_o during the months when water is available) to obtain an estimate of consumptive use. Information may also be available from local farm advisors and neighboring Districts.

c. Crop evapotranspiration, water used for leaching, water used for cultural practices (e.g., frost protection, soil reclamation, etc.)

This section quantifies crop water need. Crop water need includes crop evapotranspiration and water used for leaching/cultural practices. Determine the total crop water need and enter in Table 5.

Evapotranspiration requirements for different crops in different climates can be found in California DWR Bulletin 113-3 (April 1975), Oregon State University Miscellaneous Publication 8530 (1992), and Nevada Department of Conservation and Natural Resources - Division of Water Planning, Miscellaneous Publications.

See the Glossary for definitions of: leaching requirement and cultural practices.

d. Municipal and industrial water use

Quantify the M & I water use and enter in Table 6. Reference California DWR document *Urban Water Use, 1980-90.* Yearly M & I use can be determined by summing-up treated potable water and private M & I ground water pumping

e. Ground water recharge

Quantify water used by the District for the purposeful recharge of groundwater, including recharge ponds, applied Class II water, and water injected for ground water recharge and enter in Table 6.

f. Water exchanges or transfers

Quantify inter-district water transfers and enter in Table 6.

g. Estimated deep percolation within the District

Deep percolation - see Glossary. Deep percolation is usually estimated as the difference between applied water (minus any runoff leaving the District) and crop water use. Estimate the quantity of deep percolation and enter in Table 7.

Some deep percolation may be necessary for leaching. Excess deep percolation is considered an economic loss since water quality is degraded and energy is used for unnecessary pumping. Water applied for intentional recharge is not deep percolation.

h. Flows to perched water table or saline sink, if any

Estimate the amount of deep percolation or drainage that flows to a saline sink. Estimate the amount of deep percolation or drainage that flows to a perched water table (within five feet of the soil surface). Enter these two quantities of water in Table 7.

i. Total municipal waste water treated and discharged to ocean, if any

Quantify the treated municipal waste water that is discharged to the ocean or a saline sink in Table 7.

j. Spill or drain water leaving the District, if any

Estimate the total return flows (surface runoff) leaving the District and enter in Table 6.

k. Other

Quantify other uses of water within the District and enter in Table 6.

3. Overall Water Inventory

Compare total district water supply, quantified in Table 3, with total district water uses, Table 6.

Evaluation of the best management practices in Steps 3 and 4 requires an estimate of how much water may be conserved by each practice. Estimating the amount of water saved by certain practices may be difficult.

Parts of this process are imprecise. For example, estimating water savings from education programs is very difficult. However, this process will help the District to estimate the amount of potential water savings and the costs of achieving those savings.

Step 3. Best Management Practices for Agricultural Contractors

For the purposes of the Criteria, the Plan needs to describe the program that the District determines will best accomplish each BMP. The success of some of the practices will depend on cooperative work with other entities. Monitoring and updating will allow the District to modify planned programs that do not accomplish the practice as designed.

For each BMP, describe how the plan will be carried out, including actions, timelines, budgets, staff, and projected results (e.g. changes in conserved water, energy, chemical inputs; improved yields; increased habitat). Whenever possible, quantify the projected benefits. Identify how each practice will be monitored to see if it is achieving the projected results. Provide actions, budgets and timelines, for at least the initial 3 years of the Plan. Budget adjustments and budgets for year 4 and beyond can be provided in the District's annual update.

WHAT IS THE SUFFICIENT SIZE AND SCOPE OF EACH PRACTICE?

Design and scope of a practice should be related to the potential for improved management and implementation should be as rapid as is feasible. Each district needs to define programs appropriate for district water users.

Listed below are descriptions of practices that have been implemented by a variety of districts.

A. Critical Best Management Practices for Agricultural Contractors

1. Measure, with a device that is rated to have a maximum error of ± six percent, the volume of water delivered by the District to each customer (within five years of contract renewal or if no contract renewal date, by January 1, 1999)

Water measurement of each turnout has a variety of benefits. When customers know how much water they use for incremental time periods (monthly, per irrigation, etc.) they are able to make informed economic decisions. Typical programs to improve water measurement for each customer include the installation of meters, flumes, weirs, sonic and other flow measuring devices. However, it is important to implement a maintenance and/or replacement program in conjunction with the installation program because flow measuring devices become less accurate over time. Make sure that the flow measuring device is appropriate for the application.

An example of a measurement program is the one implemented by the Laguna Irrigation District (209-826-5672). Laguna ID delivers water to 32,000 acres of agricultural land. In 1988, the District began a project to install propeller flow meters on all district retail delivery turnouts. The goal of the project was to ensure that all growers in the District receive an equitable share of the available water. There was no method of measuring water deliveries prior to this program.

At the time Laguna ID wanted to implement a metering program, it had over 500 turnouts. To reduce cost, the District purchased 180 portable propeller flow meters of various sizes. These meters are installed at the end of the District's delivery turnouts by the District personnel when the grower orders water. Meters are read by district personnel daily during the irrigation season.

This program allowed the District to change from a rigid delivery schedule to an arranged demand system, which features flexible flow rates and shut off times. The new system ensures the equal distribution of water to all growers.

Laguna ID reports that flexible deliveries allow growers to irrigate crops according to crop need, increasing irrigation efficiency and reducing deep percolation. It also helps growers to more closely monitor water application and identify high-use fields. A comparison of deliveries in 1987 (before metering) and 1991 (after metering) indicates that 8 percent less water was used in 1991.

Laguna ID purchased 180 meters, a computer and software database to compile the meter readings, a rack to store the meters, repair parts for the meters, and training for their personnel. They also hired a consulting agency to administer the program. Project cost was approximately $260,000. The 700 district customers are pleased with the new metering system.

2. Adopt a water pricing structure for district water users based at least in part on quantity delivered

Financial variables influence the way customers use water. For example, increasing block rates exemplify a pricing structure which encourages efficiency. This is where water deliveries above district designated levels (or blocks) have higher charges. These rates are established to encourage crop-need irrigation, reducing over-irrigation and the resulting drainage.

Examples and explanations of Agricultural rate schedules can be found in *USBR's Incentive Pricing Handbook for Agricultural Water districts*, available from your USBR Area Office.

Examples include:

- Class II water rates might be a minimum fixed rate ($X per acre-foot) to encourage ground water recharge.
- Class I water rates might be increasing block.
- Per acre assessments might to used to cover the District's fixed costs.

Several districts have implemented alternative pricing structures for irrigation water and drainage water disposal. Additional funds collected through these rates have been used to improve district delivery facilities and as loans to farmers for improved on-farm irrigation systems.

Districts can also implement a customer billing program that can provide historical water delivery data to their agricultural retail customers. This would require a district to establish an accounting system that permits the easy storage and retrieval of delivery data.

In this program, districts could modify their billing statements to include water delivery data for the same period from the previous year. Growers would then have sufficient data to evaluate the effects of changes in on-farm irrigation management, crop selections and land use practices on an annual basis. Additional benefits would be that the grower could determine the total applied water for a specific crop, in a specific field, during a specific growing season and the District would have the ability to monitor and compare crop applied water data on a regional basis and document changes of trends in irrigation activity.

3. Designate staff responsible for development and implementation of the water management plan

For small districts, this could be a part-time responsibility. For larger districts, this may be a full-time responsibility with additional staff as appropriate. Conservation elements should be incorporated into all the District's plans and operations.

If a consultant is hired to write this Plan, the District should designate a conservation coordinator to coordinate the work and communicate with the USBR.

USBR staff will offer workshops to explain the requirements of the Criteria and assist with Plan development. USBR will provide technical assistance to the District's conservation coordinator during plan preparation and implementation. When necessary, USBR area office staff will meet with a district's conservation coordinator to assist with the preparation, implementation, and evaluation of the water conservation plan.

4. Provide or support the availability of the following water management services for water users:

    a. On-farm irrigation and drainage system evaluations (e.g., Mobile Labs)

On-farm irrigation system evaluations provide information that growers need to make any necessary modifications to existing irrigation systems. One-time irrigation evaluations, such as those being provided by mobile labs and other consulting services, can identify correctable problems such as worn nozzles, insufficient filtration, incorrect or irregular nozzle sizes, excessive run time, etc.

Also, evaluations often identify when and where over- or under-irrigation are occurring. For those districts with irrigation specialists on staff, on-farm evaluations could be part of the District's overall program, thus supplementing the efforts of other services or mobile labs. The California mobile lab program, with more than 20 districts participating, has evaluated more than 2,000 fields since 1981 (about 1% of the total). Agricultural consultants may also be able to perform this service for District customers.

Information on existing mobile labs can be obtained from DWR. If a mobile lab is not located in the local area, DWR can provide information on starting one.

    b. Normal year and real-time irrigation scheduling and crop ET information (e.g., CIMIS)

To assist growers to develop crop irrigation schedules, water districts can establish programs to: (1) measure and collect the necessary climatological parameters (temperature, relative humidity, wind velocities, solar radiation, and precipitation) to make proper evapotranspiration rate calculations (in both real-time or current and normal situations), (2) disseminate the data to interested district customers and others, and (3) provide technical assistance and instruction on scheduling techniques.

Climatological data for crop ET calculations and irrigation scheduling can be collected through various means. DWR has utilized the following types of climate stations to accomplish this task: (1) an evaporation pan station modeled after standard U. S. Weather Bureau stations and (2) computerized stations of California Irrigation Management Information System (CIMIS).

For an evaporation pan station, detailed discussions on the minimum standards for installation and application of the data in determining crop ET can be found in the CA DWR Bulletins 113-3 and 113-4. Water districts will have to establish a program to disseminate the data collected at these stations (newspapers, television, radio. telephone, etc.).

The CIMIS project uses computer and telecommunication technologies to collect and disseminate climatological data to districts, growers, irrigators, and others on a daily basis. Climatological data is measured and collected constantly by a network of computerized climate stations. The data is transmitted to and stored in a centralized computer, and is accessible to all interested parties within 24 hours. Hardware and software requirements to receive this data includes a personal or table-top computer and a telephone modem and communications software.

Historical climatological data can be used to develop normal year crop ET rates which can assist: (1) Districts to determine approximate quantities of water that may be requested during any particular growing season, and (2) Growers to estimate the growing season ET requirements of

crops. DWR Bulletin 113-3, provides normal year ET rates, adjusted for effective precipitation, for selected crops.

For assistance in developing training workshops and seminars in irrigation scheduling, water districts may wish to contact local offices of the University of California Cooperative Extension Farm Advisors (see Appendix C) or the Natural Resources Conservation Service (NRCS) (formerly, Soil Conservation Service). Consultants are also available to assist in the development of training courses or provide direct technical assistance to the District or growers.

c. Surface, ground and drainage water quantity and quality data

Districts with customer measurement programs can offer an additional service by providing customers with their historic water delivery records. Customers can then determine what quantities of water were applied to crops in previous years and evaluate the irrigation systems and operations. Irrigation system improvements can then be determined and implemented. If the District has water sources with a range of qualities that affects how much water is needed for leaching, providing water quality information when sources change can assist customers to use an appropriate amount of water.

For program effectiveness, districts also need to make water use and water quality information available to customers at regular, frequent intervals and upon request. Workshops can be designed to assist growers to make the best use of this information.

d. Educational programs and materials for farmers, staff, and public

The district will either sponsor or conduct educational seminars/workshops for district customers and staff. Examples of workshop topics include: information on weather, crop ET, soil moisture holding capacity, crop characteristics, irrigation scheduling, and water use planning. Input from customers, consultants, irrigators and other technical experts will be important when determining the content of these seminars/workshops.

Educational seminars/workshops can serve districts in several ways. They can be used to: (1) communicate the importance of implementing conservation programs; (2) describe conservation procedures that can be utilized by customers; and (3) provide a forum for growers, industrial users, and others to exchange ideas and experiences. These meetings also provide districts an opportunity to exchange ideas.

Various local, state and federal agencies such as the Agricultural Research Service, U.C. Cooperative Extension and Resource Conservation Districts provide technical assistance and will work with the District to provide educational seminars and workshops to water users.

B. Exemptible Best Management Practices for Agricultural Contractors

Each District shall develop a program to implement the following BMPs unless the District demonstrates that the practice does not make sense for the District to implement. Districts may spend time studying the most effective way to implement a BMP or whether a BMP is appropriate for a District. For appropriate BMPs, provide a description of the implementation plan and include time schedules, budgets and monitoring plans. If a BMP is to be studied, provide details and schedules of the study. These studies must be completed expeditiously and before the next Plan update. Districts should follow the exemption criteria (see Step 5) to justify exemptions and provide the exemption in this Step. See Attachment E for examples of circumstances under which BMPs are not applicable.

1. Distribution system lining/piping - line or pipe distributions systems to increase distribution system flexibility and capacity, decrease maintenance and reduce seepage

Seepage and evaporation losses in earthen ditches and canals can be minimized by replacement with pipelines or lining with bentonite clay, concrete or newer pour-in-place plastics/textile membranes. To reduce on-farm seepage losses, districts should consider helping growers to line their ditches or install pipelines.

An example of a district that utilizes a pipeline distribution system is Westlands Water district (209-224-1523). Westlands' permanent distribution system consists of a buried pipeline network which conveys irrigation water from the San Luis Canal, the Coalinga Canal and the Mendota Pool to 160- or 320-acre land units totaling more than 550,000 acres. The distribution system was built between 1965 and 1979. The area served by this system is approximately 88 percent of the irrigable land in the District, including all land lying east of the San Luis Canal. Most of the remaining district lands are served by farmer-constructed temporary diversions, which are maintained by the farmers for Westlands Water district.

The District's water supply is distributed through 1,034 miles of buried pipe, varying in diameter from 10 to 96 inches. Gravity and pumps feed 38 lateral pipelines from the east bank of the San Luis Canal, while water is pumped into 27 laterals on the west bank. Six partially completed laterals are served from the Coalinga Canal.

A similar project was undertaken by the Shasta View Irrigation district, located in the Klamath Falls area, in 1969. The district decided to convert from an unlined canal system to a piped water delivery system. A 65-year Rehabilitation and Betterment Act loan from the USBR funded the $3.2 million project.

Seventeen miles of buried pressure pipe replace 21 miles of unlined canal which eliminated eight small regulating reservoirs and 110 farm pumping stations. With the canal system, the District lost approximately 30 percent of its water through seepage from the unlined ditches and reservoirs. The old canals and reservoirs have been filled, graded and returned to agricultural projection.

An additional benefit of the pipe system is its ability to deliver adequate quantities of water to growers for frost protection. The elevation of the Klamath Basin is high enough that frost is a threat to the potatoes grown in the region. To protect against the affects of frost, growers turn on sprinklers in the potato fields in an attempt to control air temperature. The open canal system simple could not deliver enough water to meet the demands for frost protection throughout the District. The new pipe system was designed to operate at full pressure during frost periods, assuring growers of sufficient water to protect the potato fields.

2. Construct or line regulatory reservoirs - construct regulatory reservoirs to improve distribution system delivery flexibility

The construction and/or lining of regulatory reservoirs can provide improved distribution flexibility. improved system operation, additional supply storage, reduced operational losses, and increased flexibility in the reception of surface and/or aqueduct supplies.

The Imperial Irrigation district (619-339-7815) has constructed six regulatory reservoirs as part of its program to improve the operation efficiency of its conveyance system. Although the combined storage capacity of these reservoirs is only about 2,300 acre-feet, some of the more significant benefits of the reservoirs include: (1) storing water normally held with less efficiency in the District's canals and laterals or released to the Salton Sea (when growers are unable to use ordered water due to unexpected rainfall), (2) the ability to meet grower water delivery requests, and (3) increased distribution system operational efficiency.

3. Distribution control - modify distribution facilities and controls to increase the reliability, consistency and flexibility of water deliveries

Many factors affect the effectiveness of irrigation. Among these are soil texture, uniformity, surface gradient, length of irrigation run, weed growth, debris from previous plant growth, irrigation water quality, the chemistry of the root zone soil, the depth of the unsaturated zone, wind velocity, humidity, air temperature, design, condition and operation of the irrigation system, and the grower's expertise.

If all of the above factors are optimum, but the irrigation water is not available at the necessary time or in the appropriate quantities, irrigation effectiveness will be adversely affected. The uncertainty of the weather often does not allow a grower sufficient lead time to order water. Unlike municipal water systems, agricultural districts may not have a system that can provide water on demand.

Broadview Water district (David Cone, 209-659-2004) has increased the flexibility of water deliveries to its agricultural customers. Its past policy for scheduling water deliveries required a 48-hour advance notice and a 24-hour notice was necessary before closing a farm-level turnout. This was modified in 1990 to provide growers with more flexibility when ordering water deliveries. Many growers now apply frequent, shallow irrigations instead of the deep, infrequent irrigations used prior to 1990. Growers have the ability to begin and end irrigations on short notice, often in the same day.

Increased flexibility allows growers to irrigate only when necessary, but growers must be sure that the water will be there when needed.

4. Reuse systems - construct facilities to capture and reuse district operational spills

The design and operation of a water district's conveyance system has a significant role in the magnitude of annual operational spill losses.

Interceptor systems can be designed to capture and transport operational spills throughout a conveyance system. One type of design adds lateral-connector canals. In this design, a secondary canal is constructed at the terminus point of a series of laterals to capture operational spills. The system is designed to either pump spills back into the laterals or transport them to a reservoir for storage.

The Imperial Irrigation District (619-339-7815) has a lateral interceptor, five miles in length, that captures operation spills from the terminus points of eight lateral canals and delivers the water to more than 22,000 acres of cultivated land.

The interceptor has more than 90 automated drop leaf gates in addition to a 240 acre-foot reservoir for storage of spill water. The interceptor annually conserves approximately 8,300 acre-feet of water.

5. Incentive pricing - implement a pricing structure, such as tiered-block pricing, which promotes one or more of the following goals: a) encouraging more efficient water use at the farm level, b) supporting planned conjunctive use of groundwater, c) increasing groundwater recharge, d) reducing problem drainage, and e) improved management of environmental resources

Examples and explanations of Agricultural rate schedules can be found in *USBR's Incentive Pricing Handbook for Agricultural Water districts*, available from your USBR Area Office.

Tiered rates are established to encourage efficient irrigation practices. Because of area specific management needs (such as leaching requirements, potential supply shortages, crop types, soil and climatological conditions), districts tiered rate design and implementation will vary.

Broadview Water District (209-659-2004) implemented an increasing block-rate pricing structure for agricultural in 1989. The purpose of the program was to motivate growers to improving their on-farm irrigation operations and reduce the quantity of drain water collected in the subsurface drainage system installed beneath two-thirds of the District.

Broadview WD's block-rate pricing structure is comprised of two components: crop-specific tier levels (percolation depths (water quantities) which determine the price of water) and field-level accounting of water deliveries. The crop-specific levels are required because the volume of drain water generated from the applied water varies among crops according to the rate of crop evapotranspiration. Crops with higher ET requirements are permitted to receive additional irrigation water applications before higher prices become effective. Without these concessions, growers could be limited in the kinds of crops to plant. Field-level accounting of water deliveries encourages the growers to carefully monitor and apply their irrigation supplies.

The pricing structures for the 1989 growing season were established at 90 percent of the District-wide average irrigation depths for 1986 through 1988 for all crops. This approach incorporates locally relevant crop water requirements, soil characteristics, and irrigation practices. The 10 percent reduction in applied water was previously determined to result in a 15 percent reduction in drain water volume. Other incentive pricing structures can be as effective as this example.

6. On-farm program incentives - facilitate and/or provide financial incentives and assistance for improved on-farm water management

A grower can greatly improve water management techniques if financing is available. For some growers, the ability to implement efficient management practices and install modern irrigation system is hampered by the lack of capital. These individuals are willing to improve efficiency if long-term financing is available.

In 1992, the Broadview Water district (209-659-2004) established a low-interest loan program for their customers. It is a lease-to-own program where the grower/customer takes out a loan to purchase equipment and supplies, and owns the equipment after the loan is paid off. The grower/customer approaches the District with a on-farm water conservation proposal (e.g. the installation of new irrigation system). If the District approves of the proposal, the grower selects a retail outlet that offered the lowest bid to provide the necessary supplies and equipment. If all aspects of the proposal have been meet, the District issues the loan to grower.

The district pays 3.0% interest on the loan to a state agency and charges the growers 3.2%, which covers administrative costs. For a tax advantage, the District considers these transaction as a lease program rather than a straight low interest loan.

The program is scheduled to run for 12 years, however the District estimates that the program will be paid off within five years. During 1992, $900,000 was used by growers to improve their irrigation equipment. It should be noted that the District requires that the grower and district names be stamped on the equipment purchased under this program. Also, the grower must have insurance on the equipment.

In 1989 the Central California Irrigation District (209-826-1421), which is located on the west side of the San Joaquin Valley between Mendota and Crows Landing, implemented a conservation loan program for its growers/customers. The kinds of projects financed by the program includes pipeline installations, concreting ditches, sprinklers and drip irrigation system installations. land leveling, tailwater return systems and constructing community ditches. The District's Board of Directors encourages growers to participate in the program.

Growers may have up to five years to repay the loans. The district adds an annual interest rate of 3 percent to cover its administrative costs associated with processing the loans. The maximum dollar

amount for any individual farming entity or project is $50,000. All loans are repaid with single annual payments which are reissued to new loans.

The funding source for the program comes for surplus fees generated when the District began implementing a tiered water pricing schedule in 1989. The tiered pricing was implemented to encourage water conservation. However, several of the growers went into the second tier of pricing during that first year. Extra funds were generated and the District's Board of Directors decided to make $635,000 available for the conservation loan program.

Total funding for the loan program presently stands at $1 million. When the growers no longer wish to participate in the program, the funds will be used for other district conservation projects.

7. Conjunctive use - increase planned conjunctive use of surface and groundwater within the District

If feasible, districts should prepare and implement long-range plans to conjunctively use surface water and ground water to meet current and future demands. Generally, district conjunctive use programs store surplus imported and local surface water (aqueduct, stream diversions) in ground water aquifers. When imported and/or surface water is inadequate to meet demand (urban or agricultural), ground water is pumped and distributed.

The Arvin-Edison Water Storage District (805-854-5573) has an active conjunctive use program. The district utilizes two major spreading basins and a total of fifty-five recovery wells. During wet years, agricultural demand is adequately met with imported water supplies. Surplus supplies are transported to the spreading basins and percolated into the ground water basins. During years when the District's imported supply will not meet demand, the District pumps the stored water.

This conjunctive use program began in 1966. As of 1991, the District had stored approximately one million acre-feet of water in ground water basins. During the recent drought, this water was used to meet customer demand.

The costs to develop, implement, and maintain a conjunctive use program will include funds to construct and maintain the spreading basins and to install and maintain the ground water pumps. Where feasible, districts may wish to develop programs with neighboring districts.

8. Land management - facilitate alternative uses for lands with exceptionally high water duties, or whose irrigation contributes to significant problems

The practice of retirement or fallowing is generally considered for lands that are saline, difficult to drain (USBR class 4, for example) or where selenium levels are high (50 ppm or more). However, the decision to retire land usually includes other factors, such as alternative land use demand. Also, it may not preclude the option of re-establishing irrigated agriculture if circumstances should change.

In Arizona, recreation-oriented uses have been proposed for agricultural lands retired due to salinity problems. In other areas, golf courses and shooting ranges have been proposed.

The USBR and CA DWR are interested in working with districts to design such a program.

9. Pump efficiency evaluations - coordinate the evaluation of district and private pumps with local utilities, evaluating both energy and water efficiency

An irrigation well is an important resource and a major expense. The pump should be sized to match the capacity of the well and the needs of the farm. In addition, the pump should deliver the needed water with the lowest energy use since the efficiency of a pump influences the electricity rates.

A water district and the local utility (e.g., P G & E, 805-321-4448) can develop a cooperative pump testing service program for their customers. The program will benefit all involved parties by cutting down on energy demand, while providing ground water at the lowest possible price.

Several utilities companies currently offer a free pump testing service to their customers. A pump test report discusses the condition of a pump and well and provides improvement recommendations.

10. Operational practices and procedures - evaluate potential district, state and federal policy and institutional changes that could allow more flexibility in water delivery and carry-over storage.

Westlands Water District (209-224-1523), through negotiations with USBR, was able to change their water year so that the end of the water year could coincide with the end of the rainy season. Now Westlands' customers are better able to manage their water supplies to take advantage of effective precipitation.

For each BMP, describe how the plan will be carried out, including actions, timelines, budgets, staff and projected results. Whenever possible, quantify the projected benefits. Identify how each practice will be monitored to see if it is achieving the projected results. Provide actions, budgets and timelines, for at least the initial 3 years of the Plan. Budget adjustments and budgets for year 4 and beyond can be provided in the District's annual update. The district's implementation plan should be based on the California Urban Water Conservation Council's (CUWCC) BMP implementation schedules and targets. For additional information contact Reclamation's Regional or area office water conservation staff or the CUWCC at (916) 552-5885.

Programs developed by wholesale agencies may not be implemented at the retail customer level, except within the District's retail service area. A plan needs to describe the program that the District thinks will best accomplish the practice. The development and implementation of the BMPs in a wholesaler's plan is the responsibility of Reclamation's contractor.

The success of some of the practices will depend on cooperative work with others. Monitoring will allow the District to modify any planned programs that do not accomplish the practice as designed.

A. Critical Best Management Practices for Municipal and Industrial Contractors

1. Distribution system water audits, leak detection and repair

A water audit is a thorough examination of the accuracy of water district records and system control equipment. The goal of an audit is to identify, quantify, and verify water and revenue losses. Leak detection is the systematic method of using listening equipment to survey the distribution system, identify leak sounds, and pinpoint the exact location of hidden underground leaks. An annual system audit/leak detection program allows water districts to conduct cost-effective system repair programs.

An effective way to conserve water is to detect and repair leaks in municipal water systems. This reduces loss of water that districts have paid to obtain, treat, and pressurize. Because water leaks from the system before it reaches the consumer, districts lose revenue and incur unnecessary costs.

A water audit and leak detection program has benefits in addition to the value of water control. Meter testing performed as a part of the water audit will frequently identify customer meters that inaccurately record water use. Recalibrating inaccurate meters results in increased revenues to a district. Early detection of leaks will reduce the chances that the leaks will cause major property damage to the district or its customers. Better knowledge of the locations of valves and mains will allow the water district to react quickly when emergencies occur.

Water industry standard system audit / leak detection methodology is detailed in the American Water Works Association's "Manual of Water Supply Practices: Water Audits and Leak Detection." AWWA technical experts indicate that audits should be performed annually to be effective.

A water audit and leak detection program includes provision to inform customers whenever it appears possible that leaks exist on the customers' side of the meter.

Districts should conduct:

- An annual system water audit, determining the difference between production and sales.
- An ongoing meter calibration and replacement program.
- An ongoing leak detection and repair program focused on high probability leak areas identified

by the system map.

- A complete system wide leak detection program, repeated: when the system water audit determines losses to be greater than 10%; when the losses are less than 10% if the program is determined to be cost effective; but no less often than once every ten years.

2. Metering with commodity rates for all new and existing connections

Effective water measurement and accounting is necessary for developing a sound water management program. A district's measurement and accounting systems should be capable of tracking the amount of water delivered to individual water users. These systems are effective water management tools because they help inform both the water user and the District about the quantity, timing, and location of water use.

From the District's perspective, water measurement will help with:

- Assembling information needed for a detailed water budget
- Identifying areas where additional efficiency can be achieved
- Implementing a billing system based on deliveries
- Reduce landscape irrigation runoff and the resulting road-surface damage
- Reduce district costs for potable treatment and system pressurization
- Reduce waste water treatment quantities and costs
- Increase storage and reliable water supply

An effective water measurement system includes measurement of each water user - each home, apartment, business, park, etc. Many water purveyors now install a separate meter for landscape use at commercial, industrial, institutional and multi-residential accounts. A few purveyors also install landscape meters at single-family residential accounts.

The typical water measurement system has measurement devices at each point of supply (including each district groundwater well), at potable water and waste water treatment plants, and at some points in the delivery system. The actual number of measurement devices required depends on the size and complexity of the delivery system.

Water use accounting systems will vary between districts, depending on the number of types of customers. Water use should be tracked and stored by customer, customer type, and billing period for a number of years, usually ten or more. The appropriate accounting system must be determined at the District level, but in general, more detail is better. At a minimum, the accounting system should allow for tracking of water deliveries to individual users in order to accommodate a billing system based on deliveries.

To encourage efficient water use, a district's rate structure should be based, at least in part, on the quantity of water delivered. Quantity-based charges can be incorporated into existing rate structures to provide some degree of economic incentive for efficient water use. Fairness in water billing by ending subsidies to above-average users is a major benefit of quantity-based pricing structures.

Disincentives to efficient water use include situations where the unit price of water declines as the volume of water used increases (declining block structure) or where a fixed charge per customer is assessed regardless of the quantity of water used. Both of these examples can lead to excessive water use. By contrast, pricing structures such as increasing block rates or uniform rates provide an economic incentive for more efficient use.

3. Landscape efficiency requirements for new/existing commercial, industrial, institutional, governmental and multi-residential developments.

In California, cities and counties have either already adopted their own landscape water conservation ordinance for new and existing commercial, industrial, institutional, governmental, and multi-family customers, or are covered by the State landscape water conservation ordinance, pursuant to the "Water Conservation in Landscaping Act (California Code of Regulations, Chapter 2.7, Title 23).

To make this program effective, cities and counties should:

- establish a landscape task force with other local governments, water purveyors, the green industry and environmental / public interest groups to review, monitor, and/or revise the ordinance.
- establish, in cooperation with the landscape task force, a process to insure landscape plan review, final inspection and the monitoring of continuing compliance.
- work with planning and building departments, either directly or through the landscape task force, to assure adequate training of plan review and final inspection staff.
- if program effectiveness if diminished by city/county staff time constraints, budget or lack of landscape knowledge / expertise, provide for the use of consulting landscape architects.
- provide incentives to assist in the implementation of the efficient landscape designs and water-use technologies required by the Landscape ordinance.

To make this program effective, signatories without ordinance adoption/ enforcement authority should:

- participate with the county or city in developing, monitoring and/or revising the ordinance.
- participate, in cooperation with the landscape taskforce, with county or city in maintaining plan review, final inspection and monitoring of continuing compliance.
- publicly support the county or city government's actions to establish and maintain effective landscape water efficiency standards.
- provide incentives to customers to assist in the implementation of efficient landscape designs and water-use technologies.

4. Public information

An important component of any water management program is providing information to customers about efficient water use and water management services available through the District or other organizations. Public Information programs can be effective because many water users are unaware of potential benefits from improvements in water use efficiency. Examples of educational programs include landscape and irrigation design workshops, landscape irrigation scheduling real-time evapotranspiration (ET) information, community educational programs, and technical and financial assistance programs. Information on the following topics could be made available to customers:

- Costs and potential water savings of water management measures
- Climate-appropriate landscape designs and plants
- Efficient landscape irrigation equipment
- How to determine landscape irrigation timing and quantity based on ET data

- Efficient plumbing fixtures and district give-away / rebate programs
- Pool and spa covers and maintenance
- Commercial, industrial and institutional efficiency programs

There are a variety of ways the District could convey this information to its customers. For example, a district can sponsor workshops, provide written publications, telephone assistance, billing inserts and monthly water bills that provide water use data and previous year comparisons. Various local, state, and federal agencies provide technical assistance and cooperative programs. districts should take advantage of these resources when developing their own programs.

Demonstration projects are another useful technique for customers. In these projects, specific measures are implemented in a controlled setting to allow precise determination of the effects. The results from monitoring demonstration projects are then presented to district customers, along with cost and implementation information.

5. School education

The program should include activities such as: school outreach, advertising campaigns, educational materials for schools, participation at school events and fairs, a Web site, and parent/teacher outreach. The program should also include, as a minimum:

- offering tours of purveyor facilities to elementary schools in the purveyor's service area.
- working with schools served by the purveyor to promote school audits, reduced water bills, and innovative funding for equipment upgrades.
- working with the school districts in the water purveyor's service area to provide educational materials promoting efficient water use to one or more grade levels on an annual basis.
- working with school districts in the water purveyor's service area to offer instructional materials and assistance to all teachers of the targeted grade level in order to promote efficient water use. This program is considered successful if a high percent of the teachers of the targeted grade level(s) participate in the training and use the materials in the classroom.

6. New commercial, industrial and institutional (CII) water use review

To have an effective program, counties and cities should:

- Establish regulations requiring a water-use efficiency review of new and/or modified and/or change-of-use commercial and industrial building permits (for those with 2" and larger water meters).
- Require separate landscape water meter(s) when the combined service would require a 1 1/2" or larger meter.
- Establish a working group of water purveyors (whose customers are impacted by the regulations) to periodically monitor the effectiveness of and suggest revisions to the regulations.
- Establish, in cooperation with the above working group, a process to insure commercial and industrial permit review and final inspection.
- Work with planning and building departments, either directly or through the working group, to assure adequate training of plan review and final inspection staff.

- If program effectiveness is diminished by city/county staff time constraints, budget or lack of commercial and industrial water-use efficiency knowledge/expertise, provide for the use of consulting water conservation professionals or process engineers.
- Provide incentives to promote the use of efficient water-use technologies by commercial and industrial customers which have building permits under review.

To make this program effective, districts without ordinance adoption/ enforcement authority should:

- Participate with the county or city in developing, monitoring and revising the water-use efficiency regulations.
- Offer to assist the county or city with the review and final inspection of those permits issued within the purveyor's service area.
- Publicly support the city or county government's actions to establish and maintain effective commercial and industrial water-use efficiency standards.
- Adopt regulations requiring efficient cooling systems, recirculating pumps for fountains and ponds, and water recycling systems for vehicle washing as a condition of service.

7. Conservation pricing - water and sewer service

Effective rate structures provide incentives to customers to reduce average or peak use, or both. Such pricing includes rates designed to recover the cost of providing service; and bill for water and sewer service based on metered water use. Conservation pricing is also characterized by one of more of the following components:

- Rates in which the unit rate increases as the quantity used increases (increasing block rates) or is constant per unit regardless of the quantity used (uniform rates)
- Seasonal rates or excess-use surcharges to reduce peak demands, usually during summer months
- Rates based upon the long-term marginal cost or the cost of adding the next unit of capacity to the system
- Lifeline rates

Districts can encourage efficient water use by increasing the unit price of water as deliveries increase. With incentive pricing, a base price per unit of water is charged for all water deliveries up to a certain amount, or block. Water use in excess of this block is then charged at a higher unit price. One or more pricing levels (or 'tiers') may exist within a pricing structure. The specific design of these structures will depend on individual district objectives.

Non-conserving pricing provides no incentives to customers to reduce use. Such pricing is characterized by one or more of the following components:

- Rates in which the unit price decreases as the quantity used increases (declining block rates)
- Rates that charge customers a fixed amount per billing cycle regardless of the quantity used
- Pricing in which the typical bill is determined by high fixed charges and low commodity charges

When evaluating water pricing structures, it is important to consider potential effects on revenues generated through water sales. Determine whether the new pricing system will provide sufficient revenues to cover district operating costs or if it will result in supplemental revenues that could be used to fund improvements.

The irrigation water need within a water district is based on climate and varies by region and season. The water need for interior uses by residential, commercial, industrial and institutional customers does not vary by region or climate. The change in water use in response to a change in water price is termed "demand elasticity." Factors affecting demand elasticity include:

- Customer awareness of water cost
- Cost of water relative to other commodities
- Degree of customer efficiency

In the past, water was so inexpensive relative to other consumer costs that changes in water prices resulted in only small changes in the quantity of water used. Thus, water demand had been considered 'inelastic.' Potential changes in water demand and the resulting change in district revenue are important considerations in evaluating the design of incentive pricing structures.

To evaluate incentive pricing and other rate structures for your district, contact the American Water Works Association (AWWA) for the latest information and publications on rate design.

8. Water waste prohibition

All districts have the authority to enact a water waste prohibition ordinance which includes measures and enforcement mechanisms.

The water waste prohibition measures should include, at a minimum:

- water shall not be allowed to run off to adjoining property or to a roadside ditch or gutter
- leaking pipes, fixtures, or sprinklers shall be repaired promptly.
- open hoses not permitted - automatic shut-off nozzles are required.
- swimming pools, ponds and fountains shall be equipped with recirculating pumps. Pool draining and refilling only for health, maintenance or structural reasons - requires agency approval.

Other suggested measures, such as the following, may be permanent, seasonal or related to water shortage:

- restricting irrigation hours or days
- use of a hose to clean sidewalks, driveways, patios, streets and commercial parking lots is not permitted, except for health and safety.
- restaurants serving water only on request
- restricting the use of potable water for compaction, dust control or other construction purposes when non-potable water is available.
- flushing of sewers or fire hydrants, except for health and safety (may be permanent, seasonal or related to water shortage).

An effective program will require that the District notify all customers at least annually of the waste prohibitions - by newspaper, public notice, mailings, utility billings or a combination of such - prior to the irrigation season. The following actions are necessary if the ordinance is to be effective:

- staff responds to reports of water waste in a timely manner
- staff conducts daily water waste patrols (including some pre-dawn and post-sunset) during the

irrigation season.

Enforcement: the waste prohibitions should include a graduated series of responses to water wasting customers. Enforcement typically includes: personal notification and an offer of a water-use review / repair service, monetary fees, service termination and, in some unmetered service areas, mandatory water meter installation at customer expense.

9. Demand management staff

Designating a district water conservation coordinator serves two primary functions: it allows the District to assign water conservation responsibilities and it provides a contact person for district customers and staff. Responsibilities of a water conservation coordinator may include:

- Prepare a water conservation plan, with budget and staff requirements
- Design the District's water conservation programs
- Train the staff necessary to implement the programs
- Arrange cooperative programs with other districts and agencies
- Monitor the impacts of programs and recommend improvements

AWWA, Reclamation and other agencies provide formal training in water conservation program management. Such resources allow conservation coordinators to keep up-to-date with conservation programs, services, and technological developments.

10. Financial incentives

Financial incentives designed to induce customer participation in the district's demand management programs are an integral part of an effective water conservation plan. Incentives can be devices (showerheads, hose sprinklers, ULF toilets), or rebates (for ULF toilets, removal of excess turf, climate-appropriate landscape plants) or financial (low-interest loans to purchase industrial equipment or modify a school irrigation system). Use financial incentives whenever a conservation program is not reaching the desired number of customers.

B. Exemptible Best Management Practices for Municipal and Industrial Contractors

Each District shall develop a program to implement the following BMPs unless the District demonstrates that the practice does not make sense for the District to implement. Districts may spend time studying the most effective way to implement a BMP or whether a BMP is appropriate for a District. For appropriate BMPs, provide a description of the implementation plan and include time schedules, budgets and monitoring plans. If a BMP is to be studied, provide details and schedules of the study. These studies must be completed expeditiously and before the next Plan update. Districts should follow the exemption criteria (see Step 5) to justify exemptions and provide the exemption in this Step. See Attachment E for examples of circumstances under which BMPs are not applicable.

1. Interior and exterior water audits and incentive programs for single family residential, multi family residential, and institutional/ governmental customers

This water conservation measure involves audits of interior and exterior residential and institutional/ governmental water uses with the District providing various incentives to encourage program participation and the implementation audit recommendations. Audits identify water-saving potential

and provide information and services to improve efficiency and reduce waste. Audits are provided as a service to customers on a repeating cycle.

The scope of this measure includes single and multi-family residential use as well as institutional/ governmental uses. Institutional uses include such things as: schools, colleges and universities, prisons, public hospitals, government buildings, and military facilities.

The district should identify the top 20% of water users in each sector; contact them with an offer of a free audit; provide incentives sufficient to insure that at least 20% of the offers are accepted yearly.

The district can either train staff to perform audits or contract with private companies or other agencies for audit services. Some districts are now hiring and training unemployed individuals from diverse cultural backgrounds to implement conservation programs in neighborhoods that have had below average participation in past conservation efforts.

The district will want to carefully consider the complexity of some of the institutional sites to be audited. For instance, a university may operate multiple food service facilities equivalent to large restaurants, housing facilities of several kinds, recreational facilities, laboratories, hospital facilities, and various "industrial" types of operations, in addition to large landscapes and botanical and agricultural research.

The following variables and factors should be employed to estimate water use and savings potential.

scope of audit:

- training of auditors
- time spent per home/site
- elements and incentives

marketing approaches:

- mail
- door to door
- phone

incentives offered:

- showerheads
- toilet dams
- dual-flush devices
- sprinkler timers for hoses
- pistol-type hose nozzles
- information and instruction appropriate to each sector

leak detection/repair activities:

- system pressure
- toilets leaks (flapper and overflow)
- diverter spouts (tub spout leak rate when diverted for shower)

- plumbing (general leaks)
- water softeners (setting for softness, regeneration cycles, and valve check)
- reverse osmosis (RO) units

fixtures, devices, appliances, and other elements audited for consumption:

- showerheads
- bathtub diverter spouts
- toilets
- faucets
- sprinklers/irrigation system components
- irrigation timers
- plant types, landscaped area, slope
- oil types
- pool - leaks, covers, backwash

additional elements covered by governmental audits

- general cooling systems functioning
- cooling towers cycles
- single pass cooling systems
- production systems:

A typical residential audit would include installation of free low-flow showerheads and faucet aerators, toilet-leak test, minor toilet-leak repairs, water pressure check, leak and automatic-shutoff-valve check and adjustment for reverse osmosis and water-softening equipment, soil-type and root-structure check, irrigation timer instructions and a recommended lawn watering schedule, an irrigation-system check, as well as recommendations for drip-irrigation systems, pool covers, and other water efficiency measures. Additional incentives could include irrigation timers, soil-polymer and moisture sensing devices.

Governmental audits usually include the elements listed above as well as fixture modifications, recommendations for better maintenance practices, flow and pressure controls, and cooling system recirculation. Typical savings for uses are as follows:

- buildings 42%
- trees 31%
- libraries 54%
- parks 57%
- golf course 55%
- swimming pool 52%

- police building 73%
- bus yard 88%

2. Plumbing, new & retrofit - Implement programs to retrofit ULF toilets and/or high efficiency showerheads in existing buildings.

One section of the Federal Energy Policy Act of 1993 set national water efficiency standards for plumbing products. These standards apply to the sale and installation of toilets, showerheads and faucets. Many states have also adopted efficiency standards for plumbing fixtures.

To insure that new and remodeled homes, and replaced existing fixtures, use only the new efficient models, districts need on on-going program to:

- communicate with and provide information to local building departments and inspectors
- contact major developers and plumbing supply outlets to insure that only efficient fixtures are sold and installed
- insure that district water auditors verify that new and replaced fixtures meet the federal, state and local requirements.

Continuing support of the existing standards and new proposals will also be important to the future efficiency of the District. New water efficiency standards are being proposed for clothes washers, dish washers, and water softeners. The district can initiate and support local standards and/or state standards for car washes, laundromats, and other commercial / industrial / institutional water using fixtures and devices.

Fixture replacement program

Interior water uses are highly dependent upon the efficiency of toilets, showerheads and faucets in each building. Plumbing fixtures manufactured before the early 1980's often use two to three times as much water to provide the same service as modern fixtures. Replacing these old high-water-using fixtures is usually one of the most cost-effective conservation programs a district can implement.

The district should:

- identify pre-1980 residences and commercial, institutional and industrial buildings
- deliver retrofit kits to pre-1980 buildings that have not yet installed efficient fixtures
- provide the kits containing showerheads, faucet aerators, leak detection tablets and devices to reduce toilet flush volume for each fixture at the building
- offer to install the devices and follow up at least three times
- offer incentives so that a minimum of ten percent of identified customers install the kits annually.
- retrofit low consumption toilets and/or high efficiency showerheads in all existing buildings

3. Large landscape water audits and incentives

To make this program effective, districts should:

- identify landscapes of three acres or larger and record that information in the customer database
- have certified landscape water auditors on staff or available through cooperative agreements

- prepare and distribute multi-lingual irrigation system materials and information on irrigation scheduling (based on a local CIMIS station) for customers and landscape workers

A district should also:

- directly contact all customers with three acre or larger landscapes to offer them landscape water-use reviews (audits)
- survey past program participants to determine if audit recommendations were implemented
- provide program participants information showing the relationship between actual consumption and their ET- based water demand

A landscape water-use review program should:

- provide audits conducted by certified landscape water auditors
- provide audits that consist of a system review, to identify necessary irrigation system repairs, and, once repairs have been completed, a water-use review including measurement of landscaped area
- provide program participants with seasonal irrigation schedules by hydrozone and/or station
- provide program participants with regular reminders to adjust irrigation timer settings
- contact past program participants to offer a follow-up audit at least every five years

4. Commercial, and industrial conservation - Conduct commercial and industrial water conservation audits, water use reviews, and incentive programs for existing customers.

This water conservation measure involves audits of interior and exterior water uses by commercial and industrial accounts with the District providing various incentives to encourage program participation and the implementing audit recommendations. Audits are to be provided as a service to the customer on a repeating cycle. The purpose of each audit is to identify the water conservation potential at each site and offer technical assistance to implement conservation practices.

The district should identify the top 20% of water users in each sector; or business types know to use large amounts of water (laundries, laundromats, carpet manufactures, chemical and petroleum complexes, etc.) and directly contact them with an offer of a free audit. The district should provide incentives sufficient to insure that at least two-thirds of the offered audits are accepted.

The district can either train staff to perform audits or contract with private companies or other agencies for audit services. The district will want to carefully consider the complexity of some of the industrial sites to be audited. For instance, a factory or refinery uses specialized equipment that may only be understood by a process engineer. Many districts co-fund audits by specialized consulting process engineers to insure that the greatest possible savings are identified. Due to the rapid advancement of water treatment and process equipment, most districts offer follow-up audits at least once every five years.

The district will also want to insure that appropriate plan reviews of proposed water uses for new commercial/industrial water service are conducted. This usually involves working with the local building department and results in the issuance of recommendations for improved water use efficiency before completion of the building permit process.

An effective program will provide:

- certified commercial/industrial water auditors on staff or available through cooperative agreements
- the DWR Commercial / Industrial (CI) water-use materials to district CI customers
- cooperative CI audit programs with other utilities
- a list of available CI water-use consultants

5. Landscape water conservation for new and existing single family homes - Provide landscape water conservation audit and incentive programs for new and existing customers.

It is estimated that between 40 and 60 percent of municipal water use is for landscape irrigation. A significant portion of that water is used on large landscapes at parks, golf courses, commercial properties, cemeteries and educational institutions. districts should identify all landscapes of three acres or more, contact the owners or irrigators directly (by mail and/or telephone) and offer landscape audits. Many districts have trained their conservation staff to perform landscape audits and provide this service free to district customers.

Landscape audits provide recommendations for modifications to irrigation systems to improve distribution uniformity and maintenance. Audits are also used to determine irrigation schedules that can be used in conjunction with weekly weather data.

When to irrigate and how much water to apply are the two basic questions each irrigator and home owner must answer during the irrigation season. The answer changes week to week and depends on plant type, climate conditions, soil type, and previous water applications. Improving landscape irrigation scheduling to better match actual plant need, thereby reducing over-application of water, is a very effective water management measure. Real-time information on actual evapotranspiration is essential for effective irrigation scheduling. In order for ET to be widely used it is necessary that the information be easily available. ET distribution methods include telephone recordings, newspaper and radio notices, and direct communication with the water conservation staff.

The district should offer cost-effective incentives (irrigation timers that are compatible with low-volume emitters, hose nozzles, discounts on climate appropriate plants, etc.) sufficient to achieve large (3+ acre) landscape customer participation at least once every five years. Similar incentives should be offered to residential customers to achieve similar participation rates by the 20 percent of customers with the largest water use.

The district should also:

- provide information on climate-appropriate landscape design, plant material and efficient irrigation equipment / management to new customers and change-of-customer accounts and offer the materials to all Existing Single Family Residential accounts annually.
- offer landscape audits to all New Single Family Residential accounts and at least every fifth year to each Existing Single Family account.
- install appropriate landscaping at district facilities, phased in over the five years before the next plan revision.
- conduct an annual pre-irrigation season media campaign to notify Single Family Residential customers of district-provided landscape assistance (audits, materials, special offers, etc.).

The district, in cooperation with other water purveyors, government agencies and/or private organizations, should also:

- participate in the development / maintenance of a demonstration garden.
- participate at local and regional landscape fairs and garden shows.
- conduct cooperative education and marketing campaigns with local nurseries.
- conduct an annual irrigation season landscape media campaign.
- provide multi-lingual landscape gardener training and information.

The district should also enact and implement landscape water conservation ordinances, or if the supplier does not have the authority to enact ordinances, cooperate with the county and cities to develop and implement a landscape water conservation ordinance - requiring climate appropriate plant material, efficient landscape design and irrigation systems, limited use of turf on median strips and slopes, and restricted irrigation during peak evaporation hours.

6. Ultra low flush toilet installation program

An effective program will:

- estimate the approximate number of toilets at each account, and rank them by high, medium or low use (e.g., restaurant toilets are high use, warehouse toilets are low use)
- if possible, established a cooperative district / sanitation district ULF rebate program
- offer, through direct mail or other direct communication, ULF rebates to all, with special focus on those with the highest number of high-use non ULF-toilets (e.g., restaurants, sports facilities, schools, etc.)
- offer the necessary incentive (which may include rebates, no interest loans, vouchers, billing surcharges/rebates, etc.) to insure at least five to ten percent of non-ULF toilets are replaced with ULF toilets each year
- consider larger rebates for the more expensive high-use flushometer-type ULF installations
- investigate opportunities for community based organizations (CBOs) to receive the training and financial incentives necessary for them to implement this BMP for their constituents
- monitor the change in water use at metered-accounts which install ULF toilets

Step 5. Exemption Process

For each BMP the District proposes to NOT implement, the Plan must completely and adequately detail why the BMP cannot be reasonably implemented at this time.

APPLICABILITY

In order to justify an exemption because the BMP is not applicable to the District, the Plan must explain the reasons why the BMP does not apply to the District. This justification must be consistent with Step 1 of the Criteria titled, "Describe the District". See Attachment E for examples of circumstances under which BMPs are not applicable.

To exempt a BMP from implementation, the District must document the reasoning based on at least one of the four following constraints: cost-effectiveness, financial feasibility, environmental constraints, and legal constraints. Details necessary for justifying each exemption are explained in the following

subsections:

Cost-Effectiveness

In order to adequately justify an exemption due to cost-effectiveness, the Plan must clearly document the following:

1. A benefit-cost analysis which demonstrates that the costs to the District outweigh the benefits to the District (i.e., implementation of the BMP is either not cost-effective or not cost-beneficial). districts must perform the analysis by comparing the present value of all benefits to the present value of all costs. The projected/estimated benefits and costs and the methodology for analysis must be fully documented (benefits and costs should be quantified to the extent possible). The analysis performed for each excluded BMP (from the District perspective) must include, but is not limited to, the following benefits and costs:

Benefits

- All capital costs avoided by the District which include, but are not limited to, the costs associated with the development of new supplies (e.g., studies, construction, labor, etc.), transportation, and the required increase in storage, distribution capacity, and wastewater facilities and treatment capacity, etc.
- Operation and maintenance costs associated with the decrease in the production and distribution of water or in the treatment and disposal of wastewater which include, but are not limited to, energy, labor, treatment, storage, drainage treatment and disposal, etc.
- Water purchases avoided by the District
- Environmental costs avoided by the District
- Environmental enhancements
- Revenues from other entities which include, but are not limited to, revenue from the sale of water made available by the BMP, financial incentives received from other entities, etc.
- Other benefits to the District customers which include, but are not limited to, hydropower, improved crop yields, improved crop quality, labor savings, fertilizer savings, increased farm income, etc.

Costs

- Capital expenditures incurred by the water supplier for implementation of the BMP which include, but are not limited to, equipment, supplies, materials, construction, etc.
- Operation and maintenance costs to plan, design, implement, enforce, and evaluate the practice
- Financial incentives to customers
- Losses in revenues
- Costs to the environment
- Other costs to the District

Several accepted benefit-cost analysis methodologies exist (e.g., California Energy Commission's Integrated Resource Planning Methodology, generally accepted accounting principles, etc.). At this time, each district is considered to be the best suited to evaluate its own economic situation with an appropriately chosen methodology (the Plan must document the methodology).

2. A discussion and quantification, to the extent possible, of other benefits associated with the implementation of the BMP that may be of interest to potential partners, but are not the direct sole responsibility of the District; and

3. Any inquiries and efforts by the District and by Interested Parties to enter into partnerships (see "Partnerships with Interested Parties" - included).

FINANCIAL FEASIBILITY

In order to adequately justify an exemption due to financial feasibility, the Plan must clearly document the following:

1. The benefits and costs of the BMP to the District; and
2. The district funding needed to implement the cost-effective BMPs; and
3. A discussion regarding why the District cannot finance the BMP through rate adjustments, assessments, etc.; and
4. A discussion of the District's reasonable efforts to secure funding from other entities which include, but are not limited to, lending institutions and bonding authorities and an explanation of why these entities would not provide funding; and
5. Any inquiries and efforts by the District and by Interested Parties to enter into partnerships (see Partnerships with Interested Parties below); and
6. The required amount of a grant or subsidy that would be needed to feasibly implement the BMP if financing or partnerships could not be obtained.

PARTNERSHIPS WITH INTERESTED PARTIES

Although a district may not be able to implement a BMP alone, a district may be able to do so with the assistance of a partner. A partnership with other entities may decrease the costs and/or increase the benefits of a BMP, making it economically feasible for the District to implement. A partner may also provide financial assistance, making the BMP financially feasible for the District to implement. It is the District's responsibility to make reasonable efforts to provide information to potential partners and to seriously consider partnership proposals.

USBR recognizes that districts have limited resources to actively search for partners. In order to facilitate partnership development, USBR will develop and maintain a list of "Parties Interested in Partnerships to Implement Best Management Practices" (Interested Parties List). To compile this list, USBR will solicit names and addresses of parties interested in participating in partnerships. In order to keep the list current, additions and deletions shall be made by notifying USBR. Upon request, USBR will provide districts with the list of Interested Parties.

USBR will also keep a second list of all proposed and previously justified exemptions by the Districts and the justification for each BMP exemption (Exemption List). USBR will periodically distribute the Exemption List to all on the Interested Parties List and others upon request. Any interested party can request a copy of the supporting documentation for a BMP exemption from USBR and perform their own economic and financial evaluations. Interested parties may pursue

negotiations with districts to cost share a BMP that is not economically or financially feasible for the District to implement alone.

To obtain a copy of either list (which will be updated quarterly), please contact USBR's Water Conservation Center at 916/978-5038 or write to:

Water Conservation Program
Bureau of Reclamation
2800 Cottage Way - MP 402
Sacramento, CA 95825

If a BMP has been excluded from implementation, documentation of inquiries and efforts by the District and by Interested Parties to enter into partnerships shall be considered reasonable if the documentation contains:

1. Date of the Plan(s) and annual updates, if applicable, in which the District initially proposed the exemption and provided the supporting documentation to USBR, as required in Step 5D of the Criteria.
2. Documentation of all inquiries during the previous year by Interested Parties to enter into partnerships with the District. This information shall include, but is not limited to: a) identification of the Interested Party, b) which BMP(s) the party was interested in cost-sharing, c) the proposed contribution from the Interested Party towards implementing the BMP, and d) documentation of any discussion/negotiation with the Interested Party.
3. A detailed explanation of the reasons why the District could not negotiate a satisfactory partnership with the Interested Party. These reasons must be justified by the same constraints listed in these criteria (e.g., economic, financial, legal, etc.).

ENVIRONMENTAL CONSTRAINTS

In order to justify an exemption due to known adverse environmental impacts, the Plan must document the critical environmental issues and known (qualitative and/or quantitative) negative impacts of the BMP and an explanation of why effective mitigation of these impacts is not possible. If mitigation of the environmental impacts is possible, the practice must be implemented unless it can be exempted by another exemption category. For example, if the mitigation costs make the project economically infeasible, a discussion of the mitigation plan and necessary mitigation costs should be included as a part of the economic analysis. (See Appendix K)

LEGAL CONSTRAINTS

In order to justify a BMP exemption because it would not be legal for the District to implement, the Plan must detail the following:

1. A list of any known laws, regulations, court decisions, or other legal constraints that make it illegal for the District to implement the BMP; and
2. A list of the steps that would be required to remove these constraints; and
3. A description of what steps the District has taken to remove these constraints; and
4. Documentation of efforts by the District to work with other entities, if any, that would have the legal authority to carry out the BMP within the District's service area.

ANNUAL UPDATES

Conditions justifying exemptions may change with time; therefore, USBR will review exemption justifications included in the Water Conservation Plan for current relevance each year with the annual updates. Each annual update should a) specify whether or not the information included in the Plan is still valid, b) document any contacts from parties interested in a partnership with the District to implement a BMP, and c) explain the reasons why partnerships, if contacted by an interested party, could not be satisfactorily negotiated.

Attachment A

Water Shortage Contingency Plan Elements

Contact the California DWR, Water Conservation Office (WCO), for assistance. More than 300 California water districts have adopted Water Shortage Contingency Plans and these are available as models for other districts. A Sample plan is also available on computer disk. Telephone 916-327-1770 for more information.

Conjunctive Use Worksheet

BASIC INFORMATION NECESSARY FOR GROUNDWATER SECTIONS

Step 1

Provide information on the native groundwater quality and identify water quality problems. Is the groundwater adequate for direct use or is blending possible? What is the minimum quality of recharge water that could be utilized without degrading the native groundwater quality beyond use?

Continue to Step 2 if the native groundwater quality is acceptable, or would be with the dilution resulting from groundwater recharge.

Stop here if the existing groundwater quality is unacceptable for any of the uses defined above.

Step 2

Provide information on the amount of groundwater storage capacity currently available. How much additional storage could be available by extracting groundwater for use?

Continue to Step 3 if existing groundwater is available, or storage could be available due to increased groundwater use.

Stop here if no groundwater storage is available or could be made available.

Step 3

Identify existing and potential recharge sites (spreading basins, instream or injection wells) and describe the soil types and recharge rates.

Identify existing and potential extraction well fields and specify the extraction rates.

Continue to Step 4 if possible recharge and extraction sites are available.

Stop here if no recharge and/or extraction locations are physically possible due to soil type.

Step 4

Determine if hydraulic continuity exists between the possible recharge and extraction areas.

Continue to Step 5 if hydraulic continuity exists between any of the possible recharge and extraction areas.

Stop here if no hydraulic continuity exists between any of the possible recharge and extraction areas.

Step 5

Identify possible sources of recharge water and the quantities, qualities and time of availability from each source.

Crop List

barley
corn - field
oats
rice
sorghum
wheat
other cereals

alfalfa
clover
irrigated pasture
other hay
silage
other forage

cotton
hops
safflower
sugar beats
soybeans
other field crops

asparagus
beans
broccoli
cabbage
carrots
cauliflower
celery
corn
cucumbers
garlic
greens
lettuce
melons
onions
peas
peppers
potatoes
squash
tomatoes
other vegetables

Sudan grass
Bermuda grass
other grasses

apples
apricots
avocados
berries (all kinds)
cherries
grapefruit
lemon / limes
oranges / tangerines
dates
grapes
olives
peaches
pears
prunes / plums
strawberries
other fruits

almonds
pecans
pistachios
walnuts
other nut trees

ornamental nursery
joboba
other

Irrigation Methods List

Level Basin, 1/4 mile
Level Basin, 1/8 mile
Graded, surface 1/2 miles
Graded, surface 1/4 miles
Graded, surface 1/8 mile
Sprinkler, center pivot
Sprinkler, linear move
Sprinkler, solid set
Sprinkler, hand move
Trickle, spray
Trickle, subsurface
Trickle, surface

Information Required of Districts Located in the Drainage Problem Area

Districts included in the drainage problem area, as identified in A Management Plan for Agricultural Subsurface Drainage and Related Problems on the Westside San Joaquin Valley (September 1990), are listed, by sub-area, below. If future editions of the drainage report revise the boundaries of the drainage problem area or other factors used to determine which districts are in the drainage problem area, Reclamation will revise Attachment A to conform with the current drainage report.

1. Reclamation districts in the **Grasslands Subarea**: Broadview WD, Central California ID, Del Puerto WD, Firebaugh Canal WD, Mercy Springs WD, Pacheco WD, Panoche WD, San Luis Canal Company, San Luis WD.
2. Reclamation districts in the **Westlands Subarea**: James ID, Tranquillity ID and Westlands WD.
3. Reclamation districts in the **Tulare Subarea**: Alpaugh ID, Atwell Island WD, Lower Tule River ID, and Pixley ID.
4. Reclamation districts in the **Kern Subarea**: Alpaugh ID.

Districts listed above shall describe which recommendations prescribed in A Management Plan for Agricultural Subsurface Drainage and Related Problems on the Westside San Joaquin Valley (September 1990) have been incorporated in their water conservation programs to improve conditions in drainage problem areas. These recommendations include:

1. Source Control
2. Land Retirement
3. Drainage Water Treatment
4. Drainage Water Reuse
5. Shallow Groundwater Pumping
6. Evaporation Ponds

Provide a description and level of expenditure for each activity designed to address the recommendations of the San Joaquin Valley Drainage Program. Identify how implementation of the recommendations has or will substantially reduce deep percolation on drainage problem lands. Describe which recommendations have not been implemented and why.

Non-Applicability (N/A) of Exemptible BMPs

To establish that a BMP is not applicable to the District, the Plan should explain the reasons why the BMP does not apply to the District. This justification must be consistent with Step 1 of the Criteria titled, "Describe the District." Examples of non-applicability for each exemptible BMP are listed below. This list is not all inclusive.

Step 3, B. Exemptible Best Management Practices for Agricultural Contractors

1. **Distribution system lining/piping** - NA could include: completely piped systems, unlined systems or sections of systems which are used as part of a planned conjunctive use program
2. **Regulatory reservoirs** - NA could include: completely piped systems which do not have delivery constraints
3. **Distribution control** - NA could include: completely piped systems which do not have delivery constraints
4. **Reuse systems** - NA could include: completely piped systems which do not have delivery constraints
5. **Incentive pricing** - None identified
6. **On-farm program incentives** - None identified
7. **Conjunctive use** - NA could include: districts which do not overlie a useable ground water basin and thus neither the District nor its customers pump or use ground water
8. **Land management** - NA could include: districts without irrigable lands that have exceptionally high water duties or whose irrigation does not contribute to significant problems
9. **Pump efficiency evaluations** - NA could include: districts where neither the District nor its customers use ground water pumps, lift pumps, pressure pumps, filter pumps, etc.
10. **Operational practices and procedures** - None identified

Step 4, B. Exemptible Best Management Practices for Municipal and Industrial Contractors

1. **Interior and exterior water audits and incentive programs for single family residential, multifamily residential, and governmental/institutional customers** - None identified.
2. **Plumbing, new & retrofit** - NA could include: districts which supply water only to structures which have no plumbing fixtures or supply water only for exterior uses.
3. **Large landscape water audits and incentives** - NA could include: districts which do not supply water to any landscape of three acres or more.
4. **Commercial, industrial and institutional conservation** - NA could include: districts which provide water only to residential customers.
5. **Landscape water conservation for new and existing single family homes** - NA could include: districts which provide no water to residential customers.
6. **Ultra low flush toilet replacement** - None identified

Glossary

AFY: Acre-feet per year or AF/year. The amount of water needed to cover one acre of land one foot deep (325,900 gallons).

Affected Parties: A person, persons or party that reside over a ground water basin and rely on the ground water as a water supply.

Benefit-Cost Analysis: An analytical procedure used in an economic evaluation of projects to: (1) Indicate relative merits of alternative competing physical project proposals by identifying, measuring, timing, and comparing project economic benefits and economic costs; (2) Determine the size, scope, and capacity of projects; (3) Establish construction priorities and develop time schedules. A detailed analysis that yields a benefit-cost ratio greater than one demonstrates that the benefits of a practice are greater than the costs. (DWR Planning Manual Economic August 1968)

Benefit-Cost Ratio: Benefits and costs measured in money terms are expressed as a ratio by dividing costs into benefits. These costs and benefits must be measured from the same point of view and to the same extent and depth. A project must have a benefit cost ratio in excess of unity to be economically justified. (DWR Planning Manual, August 1968)

Best Management Practices: The USBR Criteria defines agricultural best management practices as those practices listed in Step 5 A and Step 5 B. Municipal and Industrial Best Management Practices are defined in the Memorandum of Understanding (see MOU).

California Irrigation Management Information System (CIMIS): The CIMIS system is a network of weather stations that are electronically connected to a mainframe computer which downloads the individual stations weather data and calculates ETo to be used in irrigation scheduling. The ETo data is available through DWR.

Class I Water: Some USBR contracts provide Class I Water, which is water made available for delivery as a dependable delivery during each year. (USBR)

Class II Water: Contracts for water served after delivery of water to firm yield contractors on an if-and-when water available basis. (USBR)

Conjunctive Operation: The operation of a ground water basin in coordination with a surface water storage and conveyance system. The purpose is to recharge the basin during years of above average water supply to provide storage that can be withdrawn when surface water supplies are below normal.

Cost-Beneficial: When the project/program benefits are equal to or greater than the cost of the project/program.

Cost Effectiveness: An economic analysis method that results in choosing a project or design that minimizes the cost of achieving a predetermined objective, e.g., producing so much electric power. In this method objectives are specified in quantified non-value (e.g., physical) terms and the attempt is made to minimize the cost of achieving the specific physical objectives (American Geophysical Union - Water Resources Monograph, Benefit Cost Analysis for Water System Planning, Charles W. Howe).

Crop Coefficients (Kc): Conversion numbers multiplied by the evapotranspiration of a reference crop

to estimate the evapotranspiration of the other crops. Crop coefficients vary from very small (around 0.15 for early season row crops) to very large (around 1.3 for walnuts in mid-season). Kc values for major crops are available from Cooperative Extension offices.

Cultural Practices: Irrigation water which is used for necessary farming practices such as soil reclamation, climate control, crop quality, and weed germination, expressed as a depth of water in inches (Burt, et al., 1988).

Deep Percolation: The amount of irrigation water that flows below the crop root zone and is unavailable for evapotranspiration, expressed as a depth of water in inches or feet (Merriam & Keller, 1978).

Demand Rates: A customer's monthly bill consists of a charge for the meter, a charge for water used, plus a surcharge which depends on the customer's highest monthly use during the preceding summer. This rate schedule is intended to recover the cost of providing the capacity needs to meet summer peak loads in accordance with the customer's contribution to this peak (DWR Water Conservation Guidebook No. 9).

Decreasing Block Rates/Inverted Block Rate Structure: The cost of each increment of volume falls as a customer's use exceeds certain levels each month (DWR Water Conservation Guidebook No. 9). Decreasing block rates are no longer used.

Distribution Uniformity (DU): The ratio of the average low quarter depth of irrigation water infiltrated to the average depth of irrigation water infiltrated, expressed as a percent (ASAE, 1988).

Effective Precipitation: That portion of precipitation on irrigated acres that evapotranspired during the crop growing season and which reduces the applied water requirement. It includes the ET of precipitation which occurs during the growing season, as well as that which occurs before the growing season and is carried over into the following season as stored soil moisture (DWR Bulletin 113-4 April 1986).

Evapotranspiration (ET): The quantity of water transpired by plants, retained in plant tissue, and evaporated form adjacent soil surfaces in a specified time period. Usually expressed in depth of water per unit area. As used here, evapotranspiration is synonymous with consumptive use (DWR Bulletin 113-4 April 1986).

Evapotranspiration Potential (ETp): Evapotranspiration potential is a value calculated with a modified penman equation and is equal to daily alfalfa evapotranspiration when the crop occupies an extensive surface; is actively growing, standing erect at least eight inches tall; and is well watered so that soil water availability does not limit evapotranspiration, expressed as a depth of water in inches or feet (Burman, et al., 1980).

Flat Rates: Flat rates are used where water is not metered. They provide no incentive to conserve water, since water cost is unrelated to the quantity used (DWR Water Conservation Guidebook No. 9).

Ground Water Basin: A basin or trough-shaped structure with reasonably definable boundaries that is filled with porous and permeable material in which water can be stored and through which water can move. Basin boundaries can be lithologic, structural, hydrologic, political, or any combination of these. Where the boundary is lithologic, the basin fill material has hydraulic properties distinctively different from those of the surrounding rocks that form the basin boundary, but there can be hydraulic connection between the two rock types. The permeability, however, will be notably different.

Ground Water Overdraft: The condition of a ground water basin where the amount of water

withdrawn exceeds the amount of water that replenishes the basin over a period of time (DWR Bulletin 118-80).

Ground Water Recharge: The flow to ground water storage from precipitation, infiltration from streams, and other sources of water (DWR Bulletin 118-80).

Ground Water Table: The upper boundary of ground water where water pressure is equal to atmospheric pressure, i.e., water level in a bore hole after equilibrium when ground water can freely enter the hole from the sides and bottom (Doorenbos & Pruitt, 1984).

Hydrograph: A graph of water supply and use over time which visually shows the balance between supply and demand.

Increasing Block Rate/Tiered Block Rate Structure: The price per unit of water goes up as the customer's use exceeds certain levels each billing period. In M & I use, this schedule means that large residential customers, who are responsible for large part of the peak load on the system, pay a higher price for water. (DWR Water Conservation Guidebook No. 9) In agricultural use, this schedule means that less efficient agricultural customers will pay more to produce a crop.

Infiltration Rate: The rate of water entry into the soil expressed as a depth of water per unit of time in inches per hour or feet per day. The infiltration rate changes with time during irrigation (Burt, et al., 1988).

Irrigation Methods: The sum of the techniques used to irrigate a crop. Often is a full range of methods, such as flood pre-irritation, sprinkler germination, furrow irrigation, etc.

Irrigation Systems: For the purpose of this document the term is equal to irrigation methods.

Leaching Requirement (LR): The theoretical amount of infiltrated irrigation water that must pass (leach) beyond the root zone in order to keep soil salinity within acceptable levels for sustained crop growth. Different models may be used to estimate LR. For uniform conditions and no rainfall, a simple estimate is:

$$LR = \frac{ECw}{5ECe - ECw}$$

Where ECw is the electrical conductivity of the infiltrated irrigation water and ECe is the maximum EC of the saturated extract of the soil tolerable (not causing significant yield loss) by the crop in question. Actual leaching needed for salinity control may be more or less than this estimate depending upon uniformity of irrigation/infiltration and amount and distribution of rainfall, respectively.

Lifeline Rates: The first 300 to 600 cubic feet per month (cfm) of water use is charged at a special low rate for residential customers. This quantity of water is generally considered to be the minimum required for interior use. The rates for water over that "lifeline quantity" may be of any type (DWR Water Conservation Guidebook No. 9).

Mobile Labs: Specialized vehicles equipped with tools, equipment and qualified staff to do field and landscape irrigation system evaluations.

MOU: Memorandum of Understanding. See Best Management Practices.

Overlying Parties: A person, persons or party that reside over a ground water basin and does not pump

water or rely on the ground water as a water supply.

Plan Development: The process of gathering, analyzing and organizing the data necessary to prepare a meaningful and useful USBR Water Conservation Plan.

Plan Review Process: The process by which a district receives, evaluates and incorporates information from the public, groups and agencies concerning the concerning the scope, content and conclusions of its Water Conservation Plan

Plan Scoping Session: Pre-Plan preparation meetings at which a district solicits input from non-district parties concerning the breadth and scope of the Water Conservation Plan.

Perched Water Table: An area where ground water remains close to the surface due to an impermeable bed which restricts the water from reaching underlying unsaturated rocks of sufficient permeability to allow movement of ground water.

Pricing Signals: Rate structures which encourage water conservation requirements. Rates which increase as the quantity of water used increases are an example of a pricing signal.

Recycled Water: A type of reuse, usually involving running a supply of water through a closed system two or more times. Legislation in 1991 equates the term "recycled water" with reclaimed water.

Reference Crop Evapotranspiration (ETo): The ET rate of healthy pasture grass, completely covering the ground to a uniform height of 3 to 6 inches, and having an adequate supply of water and extensive fetch. CIMIS estimates ETo by using the University of California Modified Penman equation (DWR Bulletin 113-4 April 1986).

Representative Water Year: A year that the District staff feels is "representative" of both the supplies and demands within the District. district staff can define the year as an actual, average or a theoretical year.

Return Flows: Drain water which leaves the District is considered to be a return flow.

Reused Water: Used water that is returned to a river or ground water basin and later becomes part of water withdrawn for use.

Salt Balance: The condition when the amount of salts added to a soil profile through irrigation and the amount removed by leaching are equal (i.e., no net gain nor loss of salt in the crop root zone). This balance will be established if adequate leaching occurs each year; the average root zone salinity at equilibrium will depend upon the amount of leaching and the quality of the applied water (Hoffman, et al., 1980).

Seasonal Rates: The utility has one price schedule for water used during the winter and higher price schedule for water used during the summer. Examples include more expensive summer increasing block rates due to smaller blocks or higher changes per block (DWR Water Conservation Guidebook No. 9).

Surface Runoff: Precipitation or applied water that does not percolate into the ground and runs off the surface.

T, R & S: Township, Range, and Section, coordinates used in land surveys.

Tailwater: Applied irrigation water that runs off the lower end of a field. Tailwater is measured as the

average depth of runoff water, expressed in inches or feet.

Under Irrigation: When the water actually stored in the crop root zone during an irrigation (soil moisture replacement) is less than is needed to refill the root zone to field capacity (soil moisture deficit) in all or part of the field, expressed as a depth of water in inches or feet.

Uniform or Constant Rates: The price per unit of water is the same regardless of the amount used (DWR Water Conservation Guidebook No. 9).

Water Accounting: An accounting of the water supplies received by a district and how that water is used by the District and its customers.

Water Conservation: Improved water management and efficiency through the implementation of best management practices.

Water Transfers: Selling or exchanging water or water rights among individuals or agencies (*Reference Guide to Water Transfers in California*, June 1989).

Groups to Notify of Plan Scoping, Development and Review

CA Department of Fish and Game
1416 9th Street
Sacramento, California 95814
(916) 653-7664

CA Dept. Health, Water Quality
744 P Street
Sacramento, California 95814
(916) 323-6111

CA Dept of Forestry & Fire Protection
1416 9th Street
Sacramento, California 95814
(916) 445-9920

CA Dept of Food and Agriculture
1220 N Street
Sacramento, California 95814
(916) 654-0466

CA Environmental Protection Agency
555 Capital Mall
Sacramento, California 95814
(916) 445-3846

Calif Waterfowl Association
4630 Northgate Blvd
Sacramento, CA 95834

CalTrout Inc.
926 J St. #617
Sacramento, CA 95814

Ducks Unlimited
9823 Old Winery Place, Suite 16
Sacramento, California 95827
(916) 363-8257

Environmental Defense Fund
5655 College Avenue, #304
Oakland, CA 94618
(510) 658-8008

Friends of the River
128 J Street, 2nd Fl
Sacramento, CA 95814-2207
(916) 442-3155

League of Women Voters
2480 Union Street
San Francisco, CA 94123
415-931-4605

National Audubon Society
555 Audubon Place
Sacramento, California
(916) 481-5332

National Marine Fisheries Service
501 West Ocean Blvd., Suite 4200
Long Beach, California 90802
(310) 980-4000

Natural Heritage Institute
114 Sansome St. #1200
San Francisco, CA 94104
(415) 288-0550

Natural Resources Defense Council
71 Stevenson #1825
San Francisco, CA 94105
(415) 770-0220

National Wildlife Federation
1400 16th St. NW
Washington DC, 20036
(202) 797-6833

Save San Francisco Bay Assoc.
1736 Franklin St. 3rd Fl.
Oakland, CA 94612

Share the Water
745 Grizzly Peak
Berkeley, CA 94708

Sierra Club - Water Issues
264 E. Green St.
Claremont, CA 91711

USDA - Federal Crop Insurance Corp.
1303 J Street
Sacramento, California 95814
(916) 551-1717

US EPA - Nancy Yoshikawa
75 Hawthorne
San Francisco, California 94105
(415) 744-1939

Groups to Notify of Plan Scoping, Development and Review

Insert a Local Address or Use the Appendices to locate an Local Office

City Council
address
city, state, zip

City Planning Dept.
address
city, state, zip

City Water/Sewer Dept.
address
city, state, zip

County Board of Supervisors
address
city, state, zip

County Planning Dept.
address
city, state, zip

County Water Agency
address
city, state, zip

County Health Dept.
address
city, state, zip

County Flood Control
address
city, state, zip

County Ag. Commissioner
address (see Appendix I, page 51)
city, state, zip

County Water district
address
city, state, zip

County Sanitary Dist.
address
city, state, zip

Chamber of Commerce
address
city, state, zip

Community groups
address
city, state, zip

Labor groups
address
city, state, zip

Local Utilities
address
city, state, zip

Calif. Senator
address
city, state, zip

Calif. Assembly member
address
city, state, zip

US Representatives
address
city, state, zip

Cooperative Extension Farm Advisor
address (see Appendix D)
city, state, zip

CA Dept. of Health Services
address (see Appendix J, page 70)
city, state, zip

Resource Conservation Dist
address (see Appendix E, page 59)
city, state, zip

Farm Bureau
address (see Appendix D, page 56)
city, state, zip

Regional Water Quality Control Board
address (see Appendix H, page 66)
city, state, zip

USDA -NRCS
local address (see Appendix F, page 61)
city, CA

Groups to Notify of Plan Scoping, Development and Review

Select Local Office of Groups Listed Below

CA Dept of Fish and Game, Region 1
601 Locust Street
Redding, California 96001
(916) 225-2300

CA Dept of Fish and Game, Region 2
1701 Nimbus Road
Rancho Cordova, California 95670
(916) 355-0978

CA Dept of Fish and Game, Region 3
Post Office Box 47
Yountville, California 94599
(707) 944-5500

CA Dept of Fish and Game, Region 4
1234 East Shaw Avenue
Fresno, California 93710
(209) 222-3761

CA Dept of Fish and Game, Region 5
330 Golden Shore, Suite 50
Long Beach, California 90802
(213) 590-5132

Sierra Club-Angeles Chap.
3345 Wilshire Blvd #508
Los Angeles, CA 90010

Sierra Club - Bay Chapter
2820 College Ave.
Berkeley, CA 94703

Sierra Club - Loma Prieta
870 Gilchrist Walkway #1
San Jose, CA 95133

Sierra Club - NCal/NV
4171 Piedmont Ave. #204
Oakland, CA 94618

U.S. Fish and Wildlife Service
Eastside Federal Complex
911 N.E. 11th Ave.
Portland, Oregon 97232-4181
(503) 231-6158

U. S. Fish and Wildlife Service
2730 Loker Avenue West
Carlsbad, California 92008
(619) 431-9440

U. S. Fish and Wildlife Service
2140 Eastman Ave., Suite 100
Ventura, California 93003
(818) 644-1766

U. S. Fish and Wildlife Service
4600 Kietzke Lane, Building C, Room 125
Reno, Nevada 89502
(702) 784-5227

U.S. Fish and Wildlife Service
2800 Cottage Way, Rooms E-1803 & 1823
Sacramento, California 95825
(916) 978-4866

California Cooperative Extension County Offices

ALAMEDA (415) 670-5100, FAX (415) 670-5131
224 W. Winton Ave., Rm. 174, Hayward 94544-1298

AMADOR (209) 223-6484, FAX (209) 223-3312
12380 Airport Rd., Martell 95642

BUTTE (916) 538-7201, FAX (916) 538-7140
2279 Del 0ro Ave., Suite B, Oroville 95965

CALAVERAS (209) 754-6477, FAX (209) 754-6472
891 Mountain Ranch Rd., San Andreas 95249

COLUSA (916) 458-2105, FAX (916) 458-4625
Mail: P.0. Box 180, Colusa 95932
Location: 100 Sunrise Blvd., Suite E, Colusa

CONTRA COSTA (415) 646-6540, FAX (415) 646-6708
1700 Oak Park Blvd., Bldg. A-2, Pleasant Hill 94523

DEL NORTE (707) 464-4711, FAX (707) 464-7520
Mail: 981 H St., Crescent City 95531
Location: Courthouse Annex

EL DORADO (916) 621-5502, FAX (916) 626-4756
311 Fair Lane, Placerville 95667

FRESNO (209) 488-3285, FAX (209) 488-1975
1720 S. Maple Ave., Fresno 93702

GLENN (916) 865-1107, FAX (916) 865-1109
Mail: P.O. Box 697, Orland 95963
Location: County Road 200 East

HUMBOLDT (707) 444-9334, FAX (707) 145-7351
Agricultural Center Bldg.
5630 S. Broadway, Eureka 95501-6998

IMPERIAL (619) 352-9474, FAX (619) 352-0846
1050 E. Holton Rd., Holtville 92250-9615

INYO-MONO (619) 873-7854, FAX (619) 872-1610
207 W. South St., Bishop 93514

KERN (805) 861-2631, FAX (805) 834-9359
1031 S. Mt. Vernon Ave., Bakersfield 93307-2509

KINGS (209) 582-3211, EXT 2730, FAX (209) 582-5166
Mail: 680 N. Campus Dr., Hanford 93230
Location: Kings County Agricultural Center, Hanford

LAKE (707) 263-2281, FAX (707) 263-2399
Agricultural Center
883 Lakeport Blvd., Lakeport 95453

LASSEN (916) 257-8311, Ext. 111, FAX (916) 257-6129
Memorial Bldg., Susanville 96130

LOS ANGELES (213) 744-4851, FAX (213) 745-7513
2615 S. Grand Ave., Suite 400, Los Angeles 90007

MADERA (209) 675-7879, FAX (209) 675-0639
328 Madera Ave., Madera 93637

MARIN (415) 899-8620, FAX (415) 899-8619
1682 Novato Blvd., Suite 150-B-B, Novato 94947

MARIPOSA (209) 966-2417 ext 5321, FAX (209) 966-2056
5009 Fairgrounds Rd., Mariposa 95338-9435

MENDOCINO (707) 463-4495, FAX (707) 463-4477
Mail: Agricultural Center/Courthouse, Ukiah 95482
Location: 579 Low Gap Rd., Ukiah

MERCED (209) 385-7403, FAX (209) 722-8856
2145 W. Wardrobe Ave., Merced 95340

MODOC (916) 233-3939, Ext. 400, FAX (916) 233-3840
102 W. 4th St., Alturas 96101

MONO (See INY0-M0N0 counties listing)

MONTEREY (408) 758-4637 FAX (408) 758-3018
118 Wilgart Way, Salinas 93901

NAPA (707) 253-4221, 944-2006, FAX (707) 253-4434
1436 Polk St., Napa 94559-2597

NEVADA (916) 273-4563, FAX (916) 273-4769
Mail: 255 5. Auburn St., Grass Valley 95945
Location: Veterans Memorial Bldg.

ORANGE (714) 447-7150, FAX 1714) 774-1733
1000 5. Harbor Blvd., Anaheim 92805

PLACER 800-488-4308, ext 7385, FAX (916) 889-7397
11477 E Ave., Auburn 95603

PLUMAS-SIERRA (916) 283-0250, FAX (916) 283-4210
208 Fairgrounds Rd., Quincy 95971

RIVERSIDE (714) 683-6491, FAX (714) 788-2615
21150 Box Springs Rd., Moreno Valley 92387

SACRAMENTO (916) 366-2013, FAX (916) 366-4133
4145 Branch Center Rd., Sacramento 95827

SAN BENITO (408) 637-5346, FAX (408) 637-7111
649-A San Benito 5t., Hollister 95023

SAN BERNARDINO (714) 387-2171, FAX 387-3306
777 E. Rialto Ave., San Bernardino 92415-0730

SAN DIEGO (619) 694-2845, FAX (619) 694-2849
5555 Overland Ave., Bldg. 4, San Diego 92123

SAN FRANCISCO (415) 871-7559
300 Piedmont Ave., Bldg. C, Rm. 305A, San Bruno 94066

SAN JOAQUIN (209) 468~1085, FAX (209) 462-5181
420 5. Wilson Way, Stockton 95205

SAN LUIS OBISPO (805) 549-5940, (805) 549-4316
2156 Sierra Way, Suite C, San Luis Obispo 93401

SAN MATEO (415) 726-9059, FAX (415) 726-9267
625 Miramontes St., Suite 200, Half Moon Bay 94019

SANTA BARBARA (805) 681-5630, 961-3689
FAX (805) 681-5640
5266-B Hollister Ave., Suite 215, Santa Barbara 93111

SANTA CLARA (408) 299-2635, FAX (408) 246-7016
2175 The Alameda, San Jose 95126

SANTA CRUZ (408) 761-4056, FAX (408) 761-4106
1432 Freedom Blvd., Watsonville 95076-2796

SHASTA (916) 224-4900, FAX (916) 224-4904
3179 Bechelli Ln. Suite 206, Redding 96002

SIERRA (See Plumas-Sierra counties listing)

SISKIYOU (916) 842-2711, FAX (916) 842-6931
1655 5. Main St., Yreka 96097

SOLANO (707) 421-6790, FAX (707) 429-5532
2000 W. Texas St., Fairfield 94533-4498

SONOMA (707) 527-2621, FAX (707) 527-2623
2604 Ventura Ave., Rm. 100, Santa Rosa 95403-2894

STANISLAUS (209) 525-6654, FAX (209) 525-4619
Mail: 733 County Center 111 Court, Modesto 95355
Location: Scenic Dr. & Oakdale Rd., Modesto

SUTTER-YUBA (916) 741-7515 FAX (916) 673-5368
142-A Garden Hwy. Yuba City 95991

TEHAMA (916) 527-3101, FAX (916) 527-0917
Mail: P.0. BOX 370, Red Bluff 96080
Location: 1754 Walnut St., Red Bluff

TRINITY (916) 628-5495, FAX (916) 628-5495
Mail: P.0. BOX 490, Hayfork 96041
Location: County Fairgrounds, Hayfork

TULARE (209) 733-6363, FAX (209) 733-6720
Mail: Agriculture Bldg., County Civic Center, Visalia 93291
Location: 2500 W. Burrel Ave., Visalia

TUOLUMNE (209) 533-5695, FAX (209) 532-8978
Mail: 2 S. Green St., Sonora 95370
Location: 52 N. Washington St., Sonora

VENTURA (805) 654-2924, FAX (805) 648-9221
800 S. Victoria Ave., Ventura 93009

YOLO (916) 666-8143, FAX (916) 666-8736
70 Cottonwood St., Woodland 95695

YUBA (See SUTTER-YUBA counties listing)

County Farm Bureaus

Alameda County Farm Bureau
638 Enos Way
Livermore, 94550
Diane Andrade, Manager
510-449-1677

Amador County Farm Bureau
34 Summit Street, Suite C
Jackson, 95642
Jean Scalon, Manager
209-223-0951

Butte County Farm Bureau
2580 Feather River Blvd.
Oroville, 95965
Margery L. Taylor, Exec. Director
916-533-1473 FAX 916-533-7412

Calaveras County Farm Bureau
P.O. Box 490
Angels Camp, CA 95222
Tina Torres, Manager/Secretary
209-736-4666

Colusa County Farm Bureau
P.O. Box 459
Williams, CA 95987
Robert Herkert, Executive Manager
916-473-2505 FAX 916-473-5933

Contra Costa County Farm Bureau
5554 Clayton Road
Concord, CA 94521
Mrs. Susan Spannagel, Exec. Secretary
510-672-5115 FAX 510-672-8382

Del Norte County Farm Bureau
P.O. Box 789
Smith River, CA 95567
Marcie V. Houser, Secretary/Treasurer
707-487-8095

El Dorado County Farm Bureau
2460 Headington Road
Placerville, CA 95667
Ms. Michel Miller, Manager
916-622-7773

Fresno County Farm Bureau
1274 West Hedges
Fresno, CA 93728
C.W. "Bill" Allison, Manager
209-237-0263 FAX 209-237-3396

Glenn County Farm Bureau
501 Walker Street
Orland, CA 95963
Cindy Cushman Manager
916-865-9636 FAX 916-865-3324

Humboldt County Farm Bureau
P.O. Box 308
Fields Landing, CA 95537
Katherine Queen, Exec. Director
707-443-4844 FAX 707-443-0611

Imperial County Farm Bureau
1000 Broadway
El Centro, CA 92243
Wes Bisgaard Manager
619-352-3831 FAX 619-352-0232

Inyo/Mono County Farm Bureau
218 S. Main, Suite A
Bishop, CA 93514
Ms. Andy Rossi, Secretary
619-873-7398

Kern County Farm Bureau
P.O. Box 2425
Bakersfield, CA 93303
Loren Hodge, Secretary/Manager
805-323-7897 FAX 805-323-4138

Kings County Farm Bureau
870 W. Greenfield Avenue
Hanford, CA 93230
Kelly Maytubby, Executive Director
209-584-3557 FAX 209-584-1614

Lake County Farm Bureau
65 Soda Bay Road
Lakeport, CA 95453
Raymond Mostin, Manager

707-263-0911

Lassen County Farm Bureau
P.O. Box 151
Susanville, CA 96130
Michelle Upton, Secretary
916-257-7242

Los Angeles County Farm Bureau
1006 West Lancaster Blvd.
Lancaster, CA 93534
Patty Zellers, Executive/Secretary
805-948-6571

Madera County Farm Bureau
13314 Road 26
Madera, CA 93637
Betty Crawford, Secretary/Manager
209-674-8371

Marin County Farm Bureau
520 Mesa Road
Point Reyes Station, CA 94956
Phyllis Hartley, Executive Director
415-663-1231

Mariposa County Farm Bureau
P.O. Box 1297
Mariposa, CA 95338
Kinzetta Trimble, Sec./Manager
209-966-3848

Mendocino County Farm Bureau
303-C Talmadge Road
Ukiah, CA 95482
Carre Brown, Exec. Administrator
707-462-6664 FAX 707-462-6681

Merced County Farm Bureau
P.O. Box 1232
Merced, CA 95341.
Mike Wade, Manager
209-723-3001 FAX 209-722-3814

Modoc County Farm Bureau
P.O. Box 1692
Alturas, CA 96101
Pat Enz, Secretary
916-233-3276 FAX 916-233-3276

Monterey County Farm Bureau
512 Pajaro Street, Suite 12
Salinas, CA 93901
William H. Barker, Exec. Director
408-422-9063 FAX 408-422-9065

Napa County Farm Bureau
4075 Solano Avenue
Napa, CA 94558
Mary Handel, Executive Director
707-224-5403 FAX 707-224-7836

Nevada County Farm Bureau
P.O. Box 27
Grass Valley, CA 95945
John Taylor, Secretary/Manager
916-272-1007

Orange County Farm Bureau
2512 Chambers Rd., Ste. 203
Tustin, CA 92680
Nanci Jimenez, Manager
714-573-0374 FAX 714-573-0376

Placer County Farm Bureau
P.O. Box 317
Newcastle, CA 95658
Mrs. Lillian Kennedy, Exec. Secretary
916-663-2929

Plumas-Sierra County Farm Bureau
P.O. Box 35
Loyalton, CA 96118
Mrs. Helen Roberti, Sec./Treasurer
916-993-4550

Riverside County Farm Bureau
21160 Box Springs Road, Suite 102
Moreno Valley, CA 92557
Robert Perkins, Executive Manager
714-684-6732 FAX 714-782-0621

Sacramento County Farm Bureau
8467 Florin Road
Sacramento, CA 95828
J R Nelson, Executive Manager
916-383-2841 FAX 916-383-2842

San Benito County Farm Bureau
341 Tres Pinos Road, Ste. 202A
Hollister, CA 95023
Mildred Freeborn, Executive Director
408-637-7643

San Bernardino County Farm Bureau
210 South Riverside Avenue
Rialto, CA 92376
Dona Throop, Manager
714-875-5945

San Diego County Farm Bureau
1670 East Valley Parkway
Escondido, CA 92027
Dave Owen, Executive Director
619-745-3023 FAX 619-489-6348

San Joaquin County Farm Bureau
P.O. Box 8444
Stockton, CA 95208
Robert Cabral, Executive Manager
209-931 -4931 FAX 209-931 -1433

San Luis Obispo County Farm Bureau
651 Tank Farm Road
San Luis Obispo, CA 93401
Marilyn Britton, Executive Manager
805-543-3654 FAX 805-543-3697

San Mateo County Farm Bureau
765 Main Street
Half Moon Bay, CA 94019
Betty Stone, Executive Manager
415-726-4485 FAX 415-726-4495

Santa Barbara County Farm Bureau
P.O. Box 1846
Buellton, CA 93427
Richard Morgantini, Secretary/Manager
805-688-7479 FAX 805-688-2248

Santa Clara County Farm Bureau
1368 North 4th Street
San Jose, CA 95112
Suzanne Ketcherside, Exec. Director
408-453-0100 FAX 408-453-0102

Santa Cruz County Farm Bureau
141 Monte Vista Ave.
Watsonville, CA 95076
Jess Brown, Executive Director
408-724-1356 FAX 408-724-5821

Shasta County Farm Bureau
3605 Bechelli Lane
Redding, CA 96001
Shawna DeSilva, Sec./Manager
916-223-2358

Siskiyou County Farm Bureau
809 South 4th Street
Yreka, CA 96097
Joan Smith, Executive Director
916-842-2364 FAX 916-842-5041

Solano County Farm Bureau
2210 Boynton Ave, Ste. E
Fairfield, CA 94533
Mary Ann Diehl, Exec. Secretary
707-425-8044

Sonoma County Farm Bureau
P.O. Box 6674
Santa Rosa, CA 95406
Judy Van Winkle, Executive Director
707-544-5575 FAX 707-542-8130

Stanislaus County Farm Bureau
P.O. Box 3070
Modesto, CA 95353
Jan Ennenga, Executive Manager
209-522-7278 FAX 209-521-9938

Tehama County Farm Bureau
1130 Metzger Rd.
Red Bluff, CA 96080
Claudia Pickard, Exec. Secretary
916-527-7882 FAX 916-527-8312

Trinity County Farm Bureau
P.O. Box 1216
Hayfork, CA 96041
Carole Lucan, Secretary
916-628-5030

Tulare County Farm Bureau
P.O. Box 748
Visalia, CA 93279
Laurena Johnson, Exec. Director
209-732-8301 FAX 209-732-7029

Tuolumne County Farm Bureau
14570 Mono Way, Suite C
Sonora, CA 95370
Cheryl Thompson, Secretary
209-532-5102

Ventura County Farm Bureau
P.O. Box 3160

Ventura, CA 93006
Rex Laird, Executive Director
805-656-3552 FAX 805-642--2303

Yolo County Farm Bureau
P.O. Box 1556
Woodland, CA 95695
Elaine Timothy, Secretary/Manager
916-662-6316

Yuba-Sutter County Farm Bureau
475 Palora Avenue
Yuba City, CA 95991
Doris Joaquin, Executive Secretary
916-673-6550 FAX 916-671 -5836

California Resource Conservation Districts

Some of the local Resource Conservation districts listed below are inactive, so only the local phone numbers have been provided. Call the Area Office to get a local RCD address.

Area 1 - Jim Aven, P.O. Box 303, Weaverville, CA 96093, (916) 623-4659

includes Butte, Glenn, Lassen, Modoc, Plumas, Shasta, Siskiyou, Tehama and Trinity counties.

Area 2 - Alan Mohr, 405 Orchard Avenue, Ukiah, CA 95482, (707) 462-3256

includes Alameda, Contra Costa, Del Norte, Humboldt, Lake, Marin, Mendocino, Napa and Sonoma counties

Area 3 - Chauncey Poston, 13650 Day Road, Grass Valley, CA 95945, (916) 272-5030

includes Alpine, Amador, Calaveras, El Dorado, Inyo, Mono, Nevada, Placer, Sierra and Tuolumne counties

Area 4 - George Steiner, P.O. Box 591, Oregon House, CA 95962, (916) 692-1153

includes Colusa, Sacramento, San Joaquin, Solano, Stanislaus, Sutter, Yolo and Yuba counties

Area 5 - Roberta Smith, P.O. Box 174, Davenport, CA 95017, (408) 429-1068

includes Monterey, San Benito, San Francisco, San Luis Obispo, San Mateo, Santa Clara and Santa Cruz counties.

Area 6 - Harold Parker, 2243 Los Encinos Road, Ojai, CA 93023, (805) 649-9270

includes Los Angeles, Santa Barbara and Ventura counties

Area 7 - Eddie Walker, P.O. Box 878, Thermal, CA 92274, (619) 399-5131

includes Riverside and San Bernardino counties

Area 8 - Morris Johnson, 1276 Loma Vista Way, Vista, CA 92084, (619) 727-0487

includes Imperial, Orange and San Diego counties

Area 9 - Dan Ramos, 21593 W. Sunset Avenue, Los Banos, CA 93635, (209) 826-0852

includes Fresno, Kern, Kings, Madera, Mariposa, Merced and Tulare counties.

AREA 1

Butte Valley RCD	916-398-4411
Central Modoc RCD	916-233-4137
Fall River RCD	916-336-5782
Glenn County RCD	916-963-3085
Goose Lake RCD	916-233-4137
Honey Lake Valley RCD	916-257-7271

Indian-Amer. Valleys RCD	916-993-4489
Lava Beds RCD	916-667-5268
Pit RCD	916-294-5394
Shasta Valley RCD	916-467-3975
Sierra Valley RCD	916-993-4427
Siskiyou RCD	916-467-3975
Surprise Valley RCD	916-279-6110
Tehama County RCD	916-527-4231
Trinity County RCD	916-623-3991
Vina RCD	916-839-2164
Western Shasta RCD	916-246-5252

AREA 2

Alameda County RCD	510-672-6522
Contra Costa RCD	510-672-6522
East Lake RCD	707-263-4180
Eel River RCD	707-444-9708
Gold Ridge RCD	707-823-7471
Marin County RCD	415-663-1231
Mendocino County RCD	707-468-9223
Napa County RCD	707-252-4188
Sotoyome-Santa Rosa RCD	707-575-1409
So. Sonoma County RCD	707-794-1242
West Lake RCD	707-263-4180

AREA 3

Alpine County RCD	702-782-3661
Amador County RCD	209-223-1846
El Dorado County RCD	916-622-1410
Georgetown Divide RCD	916-622-1410
Inyo-Mono RCD	619-872-6111
Mono County RCD	702-782-3661
Nevada County RCD	916-272-3417
Placer County RCD	916-885-3046
Tahoe RCD	916-541-5654

AREA 4

Colusa County RCD	916-458-2931
Dixon RCD	916-678-1655
Florin RCD	916-485-9883
Lower Cosumnes RCD	916-485-9883
Salida RCD	209-892-6193
San Joaquin County RCD	209-931-2587
Sloughhouse RCD	916-485-9883
S T & J RCD	209-522-7871
Stonyford RCD	916-458-2931
Suisun RCD	707-425-9302
Sutter County RCD	916-674-1461
Ulatis RCD	916-678-1655
West Stanislaus RCD	209-892-6193
Yolo County RCD	916-662-2037
Yuba County RCD	916-674-1461

AREA 5

Coastal San Luis RCD	805-772-4391
Evergreen RCD	408-288-5888
Gabilan-Santa Lucia RCD	408-385-5545
Loma Prieta RCD	408-847-4161
Monterey Coast	408-424-1036
San Benito RCD	408-636-8029
San Mateo County RCD	415-726-4660
Santa Cruz County RCD	408-688-1562
Upper Salinas-Las Tablas	805-238-0934

AREA 6

Antelope Valley RCD	805-945-2604
Cuyama RCD	805-937-6363
Lompoc RCD	805-687-7435
Santa Barbara RCD	805-569-2118
Santa Maria Valley RCD	805-937-6363
Topanga-Las Virgenes RCD	213-455-1030
Ventura County RCD	805-386-4685

AREA 7

Coachella Valley RCD	619-347-7658
East Valley RCD	714-792-3762
Eastern Kern County RCD	619-375-7454
Elsinore-Murrieta-Anza	714-654-7733
Inland Empire West RCD	714-987-0622
Mojave Desert RCD	619-242-2906
Palo Verde RCD	619-922-3446
Riverside-Corona RCD	714-683-7691
San Jacinto Basin RCD	714-654-7733

AREA 8

Bard RCD	619-572-0179
Greater Mountain Empire	619-442-0559
Imperial Irrigation district	619-339-9477
Mission RCD	619-728-1332
Palomar-Ramona-Julian	619-745-2061
Upper San Luis Rey RCD	619-728-1332

AREA 9

Ballico RCD	209-723-3354
Bonita RCD	209-673-0650
Buena Vista RCD	805-324-1101
Chowchilla-Red Top RCD	209-665-3502
Coarsegold RCD	209-868-3367
Columbia RCD	209-826-2411
East Madera RCD	209-645-0610
El Nido RCD	209-722-6450
Excelsior RCD	209-584-9209
Firebaugh RCD	209-655-4761
Grassland RCD	209-826-5188
Gustine-Romero RCD	209-854-3123
James RCD	209-693-4356
Kern Valley RCD	619-378-2328
Kings River RCD	209-584-9209

La Paloma RCD	209-389-1015	San Luis RCD	209-826-5112
Lone Tree RCD	209-722-3079	Sierra RCD	209-299-4585
Los Banos RCD	209-826-5770	Stevinson RCD	209-723-3354
Mariposa County RCD	209-966-3431	Tehachapi RCD	805-822-7596
Navelencia RCD	209-276-7494	Tranquility RCD	209-698-7225
Panoche RCD	209-364-6136	Tulare County RCD	209-732-9163
Pond-Shafter-Wasco RCD	805-861-4129	Tulare Lake RCD	209-992-3145
Poso RCD	209-392-2959	Western Kern RCD	805-861-4129
Rosedale-Rio Bravo RCD	805-861-4129	Westside RCD	209-227-2489

Offices of the National Resource Conservation Service

Appendix H

California State and Regional Water Resources Control Boards

State Water Resources Control Board
Post Office Box 100
Sacramento, California 95812-0100
Water Quality: (916) 657-0687
Clean Water Program: (916) 739-4400
Water Rights: (916) 657-2170

North Coast RWQCD
5550 Skylane Blvd. Suite A
Santa Rosa, California 95403
(707) 576-2220

San Francisco RWQCD
2101 Webster Street, Suite 500
Oakland, California 94612
(510) 464-1255

Central Coast RWQCD
81 Higuera Street, Suite 200
San Luis Obispo, California 93401-5414
(805) 549-3147

Los Angeles RWQCD
101 Centre Plaza Drive
Monterey Park, California 91754-2156
(213) 266-7500

Colorado River Basin RWQCD
73-720 Fred Waring Drive, Suite 100
Palm Desert, California 92260
(619) 346-7491

Santa Ana RWQCD
2010 Iowa Ave., Suite 100
Riverside, California 92507-2409
(714) 782-4130

San Diego RWQCD
9771 Clairemont Mesa Blvd., Suite B
San Diego, California 92124
(619) 467-2952

Central Valley RWQCD
3443 Routier Road
Sacramento, California 95827-3098
(916) 361-5600

Fresno Branch Office
3614 East Ashlan Ave.
Fresno, California 93726
(209) 445-5116

Redding Branch Office
415 Knollcrest Drive
Redding, California 96002
(916) 224-4845

Lahontan RWQCD
2092 Lake Tahoe Blvd., Suite 2
South Lake Tahoe, California 96150
(916) 544-3481

Victorville Branch Office
Civic Plaza
15428 Civic Drive, Suite 100
Victorville, California 92392-2359
(619) 241-6583

AGRICULTURAL COMMISSIONERS

Alameda County Ag. Commissioner
Michael Greene
224 West Winton Avenue, Room 184
Hayward, CA 94544-1215

Amador County Ag. Commissioner
Scott Paulsen
108 Court Street
Jackson, CA 95642-2399

Butte County Ag. Commissioner
Richard Rice
316 Nelson Avenue
Oroville, CA 95965-3302

Calaveras County Ag. Commissioner
Jearl Howard
County Government Center
El Dorado Road
San Andreas, CA 95249-9707

Colusa County Ag. Commissioner
Harry Krug
Post Office Box 1029
100 Sunrise Blvd., Suite F
Colusa, CA 95932-1029

Contra Costa County Ag. Commissioner
John de Fremery
2366 A Stanwell Circle
Concord, CA 94520-4804

Del Norte County Ag. Commissioner
Glenn Anderson
2650 West Washington Blvd.
Crescent City, CA 95531-8627

El Dorado County Ag. Commissioner
William Snodgrass
311 Fair Lane
Placerville, CA 95667-4195

Fresno County Ag. Commissioner
Cosmo Insalaco
1730 South Maple Avenue
Fresno, CA 93702-4596

Glenn County Ag. Commissioner
Ed Romano
Post Office Box 356
720 North Colusa Street
Willows, CA 95988

Humboldt County Ag. Commissioner
John Falkenstrom
5630 Broadway Street
Eureka, CA 95501-6998

Imperial County Ag. Commissioner
Steve Birdsall
150 South 9th Street
El Centro, CA 92243-2801

Inyo/Mono County Ag. Commissioner
Donald Muse
County Services Building
207 West South Street
Bishop, CA 93514-3492

Kern County Ag. Commissioner
Theodore Davis
1001 South Mount Vernon Avenue
Bakersfield, CA 93307-2857

Kings County Ag. Commissioner
M. Hugh Handley
County Government Center
680 North Campus Drive, Suite B
Hanford, CA 93230-5923

Lake County Ag. Commissioner
Mark Lockhark
883 Lakeport Blvd.
Lakeport, CA 95453-5407

Lassen County Ag. Commissioner
Kenneth Smith
175 Russell Avenue
Susanville, CA 96130-4299

Los Angeles County Ag. Commissioner
E. Leon Spaugy
3400 La Madera Avenue
El Monte, CA 91732-2696

Madera County Ag. Commissioner
Donald Cripe
332 Madera Avenue
Madera, CA 93637-5431

Marin County Ag. Commissioner
Jack Schrock
1682 Novato Blvd.
Novato, CA 94947-7021

Mariposa County Ag. Commissioner
Donald Cripe
Post Office Box 905
5009 Fairgrounds Road
Mariposa, CA 95338-0905

Mendocino County Ag. Commissioner
Dave Bengston
579 Low Gap Road
Ukiah, CA 95482-3745

Merced County Ag. Commissioner
Michael Tanner
2139 Wardrobe Ave
Merced, CA 95340-6495

Modoc County Ag. Commissioner
Les Wright
202 W 4TH Street
Alturas, CA 96101-3915

Monterey County Ag. Commissioner
Richard Nutter
120 Wilgart Way
Salinas, CA 93901-4013

Napa County Ag. Commissioner
Stephen Bardessono
1436 Polk Street
Napa, CA 94559-2597

Nevada County Ag. Commissioner
Paul Boch
Veterans Memorial Building
255 South Auburn Street
Grass Valley, CA 95945-7289

Orange County Ag. Commissioner
James Harnett
1010 South Harbor Blvd.
Anaheim, CA 92805-5597

Placer County Ag. Commissioner
Griffith Yamamoto
11477 East Avenue
Auburn, CA 95603-2799

Plumas County Ag. Commissioner
Frederick Surber
208 Fairground Road
Quincy, CA 95971-9462

Riverside County Ag. Commissioner
James Wallace
Post Office Box 1089
4080 Lemon Street, Room 19
Riverside, CA 92502-1089

Sacramento County Ag. Commissioner
Frank Carl
4137 Branch Center Road
Sacramento, CA 95827-3897

San Benito County Ag. Commissioner
Mark Tognazzini
Post Office Box 699
3220 Southside Road
Hollister, CA 95024-0699

San Bernardino County Ag. Commissioner
Edouard Layaye
777 East Rialto Avenue
San Bernardino, CA 92408-1235

San Diego County Ag. Commissioner
Kathleen Thuner
5555 Overland Avenuw, Building 3
San Diego, CA 92123-1292

San Francisco County Ag. Commissioner
G. Evan Weeth
501 Army Street, Suite 109-A
San Francisco, CA 94124-1209

San Joaquin County Ag. Commissioner
Erwin Eby
Post Office Box 1809
1868 East Hazelton Avenue
Stockton, CA 95201-1809

San Luis Obispo County Ag. Commissioner
Richard Greek
2156 Sierra Way, Suite A
San Luis Obispo, CA 93401-4556

San Mateo County Ag. Commissioner
Gail Raabe
Post Office Box 999, 728 Heller Street
Redwood City, CA 94064-0999

Santa Barbara County Ag. Commissioner
Ronald Gilman
263 Camino Del Remedio
Santa Barbara, CA 93110-1335

Santa Clara County Ag. Commissioner
Greg van Wassenhove
1553 Berger Drive, Building 1
San Jose, CA 95112-2795

Santa Cruz County Ag. Commissioner
David Moeller
175 Westridge Drive
Watsonville, CA 95076-2797

Shasta County Ag. Commissioner
Kit Cassaday
3179 Bechelli Lane, Suite 210
Redding, CA 96002-2041

Siskiyou County Ag. Commissioner
Jim Massey
525 South Foothill Drive
Yreka, CA 96097-3090

Solano County Ag. Commissioner
Susan Cohen
2000 West Texas Street
Fairfield, CA 94533-4497

Sonoma County Ag. Commissioner
Eric Lauritzen
2604 Ventura Avenue, Room 101
Santa Rosa, CA 95403-2893

Stanislaus County Ag. Commissioner
Keith Mahan
725 County Center, Three Ct.
Modesto, CA 95355-4492

Sutter County Ag. Commissioner
Stacy Carlsen
142 Harden Highway
Yuba City, CA 94991-5512

Tehama County Ag. Commissioner
Heidi Hill
Post Office Box 38
1760 Walnut Street
Red Bluff, CA 96080-0038

Trinity County Ag. Commissioner
Mary Feiffer
Civil Defense Hall
Post Office Box 1466
Weaverville, CA 96093-1466

Tulare County Ag. Commissioner
Leonard Craft, Jr.
County Civic Center
2500 Burrel Avenue
Agricultural Building
Visalia, CA 93291-4584

Tuolumne County Ag. Commissioner
Gerald Benincasa
2 South Green Street
Sonora, CA 95370-4617

Ventura County Ag. Commissioner
W. Earl McHail
Post Office Box 889
815 Santa Barbara Street
Santa Paula, CA 93061-0889

Yolo County Ag. Commissioner
Raymond Perkins
70 Cottonwood Street
Woodland, CA 95695-2593

Yuba County Ag. Commissioner
D. B. 'Bernie' Engle
938 14th Street
Marysville, CA 95901-4149

Other Agencies

CA DEPT OF HEALTH SERVICES, OFFICE OF DRINKING WATER

Central California Region
Richard Haberman, Acting Chief
5545 East Shields Ave.
Fresno, California 93727
(209) 297-3883

Visalia district: Fresno, Kern, Kings and Tulare counties.
Richard Hanaman, district Engineer
5545 East Shields Ave.
Fresno, California 93727
(209) 297-3883

Merced district: Madera, Mariposa, Merced and Tuolumne counties.
Cindy Forbes, district Engineer
5545 East Shields Ave.
Fresno, California 93727
(209) 297-3883

San Bernardino district: Inyo, Mono and San Bernardino counties.
Jeff Stone, district Engineer
1836 S. Commercenter Circle, Suite B
San Bernardino, California 92408
(714) 383-4328

South Coast Region
Gary Yamamoto, Acting Chief
1449 W Temple Street, Room 202
Los Angeles, California (90026
(213) 620-2980

Los Angeles district: Los Angeles county.
Gary Yamamoto, district Engineer
1449 W Temple Street, Room 202
Los Angeles, California (90026
(213) 620-2980

San Diego district: Imperial, Riverside and San Diego counties.
Frank Hamamura, district Engineer
1350 Front Street, Room 2050
San Diego, California 92101
(714) 358-4410

Santa Barbara district: San Luis Obispo, Santa Barbara and Ventura counties.
John Curphey, district Engineer
530 E. Montecito Street, Room 102
Santa Barbara, California 93103
(805) 963-8616

Northern California Region
Albert Ellsworth, Acting Chief
8455 Jackson Road, Room 120
Sacramento, California
(916) 382-3126

Sacramento district: El Dorado, North Alpine, Nevada, Placer, Sacramento and Yolo counties.
(Vacant), district Engineer
8455 Jackson Road, Room 120
Sacramento, California
(916) 382-3126

Lassen district: Butte, Colusa, Glenn, Lassen, Plumas, Sierra, Sutter, Tehama and Yuba counties.
Gunther Sturm, district Engineer
415 Knollcrest Drive, Suite 110
Redding, California 96002
(916) 234-4800

Shasta district: Del Norte, Humboldt, Modoc, Shasta, Siskiyou and Trinity counties.
Eugene Parham, district Engineer
415 Knollcrest Drive, Suite 110
Redding, California 96002
(916) 234-4800

Stockton district: South Alpine, Amador, Calavaras, San Joaquin and Stanislaus counties.
Joseph Spano, district Engineer
31 East Channel Street, Room 270
Stockton, California 95202
(916) 948-7696

Northern Coast Region
Richard McMillian, Acting Chief
2151 Berkeley Way, Room 113
Berkeley, California 94704
(510) 540-2149

San Francisco district: Alameda, Contra Costa, Marin, San Francisco and Solano counties.
Clifford Bowen, district Engineer
2151 Berkeley Way, Room 113
Berkeley, California 94704
(510) 540-2149

Monterey district: Monterey, San Benito, San Mateo, Santa Clara and Santa Cruz counties.
Cathy Ling, district Engineer
2151 Berkeley Way, Room 113
Berkeley, California 94704
(510) 540-2149

Santa Rosa district: Lake, Mendocino, Napa and Sonoma counties.
Bruce Burton, district Engineer
50 D Street, Suite 205
Santa Rosa, California 95404-4752
(707) 567-2145

ENVIRONMENTAL CHECKLIST

1. Earth. Will the proposal result in:	Yes	Maybe	No
a. Unstable earth conditions or in changes in geologic substructures?	___	___	___
b. Disruptions, displacements, compaction, or overcovering of the soil?	___	___	___
c. Change in topography or ground surface relief features?	___	___	___
d. The destruction, covering, or modification of any unique geologic or physical features?	___	___	___
e. Any increase in wind or water erosion of soils, either on or off the site?	___	___	___
f. Changes in deposition or erosion of beach sands, or changes in siltation, deposition or erosion which may modify the channel of a river or stream or the bed of the ocean or any bay, inlet, or lake?	___	___	___
g. Exposure of people or property to geologic hazards such as earthquakes, landslides,mudslides, ground failure, or similar hazards?	___	___	___

2. Air. Will the proposal result in:	Yes	Maybe	No
a. Substantial air emissions or deterioration of ambient air quality?	___	___	___
b. The creation of objectionable odors?	___	___	___
c. Alteration of air movement, moisture, or temperature, or any change in climate, either locally or regionally?	___	___	___

3. Water. Will the proposal result in:	Yes	Maybe	No
a. Changes in currents, or the course of direction of water movements, in either marine or fresh waters?	___	___	___
b. Changes in absorption rates, drainage patterns, or the rate and amount of surface runoff?	___	___	___
c. Alterations to the course or flow of flood waters?	___	___	___
d. Change in the amount of surface water in any waterbody?	___	___	___

e. Discharge into surface waters, or in any alteration of surface water quality, including but not limited to temperature, dissolved oxygen, or turbidity?	___	___	___
f. Alteration of the direction or rate of flow of ground waters?	___	___	___
g. Change in the quantity of ground waters, either through direct additions or withdrawals, or through interception of an aquifer by cuts or excavations?	___	___	___
h. Substantial reduction in the amount of water otherwise available for public water supplies?	___	___	___
i. Exposure of people or property to water-related hazards such as flooding or tidal waves?	___	___	___

4. Plant Life Will the proposal result in:	Yes	Maybe	No
a. Change in the diversity of species, or number of any species of plants (including trees, shrubs, grass, crops, and aquatic plants)?	___	___	___
b. Reduction of the numbers of any unique, rare, or endangered species of plants?	___	___	___
c. Introduction of new species of plants into an area, or in a barrier to the normal replenishment of existing species?	___	___	___
d. Reduction in acreage of any agricultural crop?	___	___	___

5. Animal Life Will the proposal result in:	Yes	Maybe	No
a. Change in the diversity of species, or numbers of any species of animals (birds, land animals including reptiles, fish, and shellfish, benthic organisms, or insects)?	___	___	___
b. Reduction of the numbers of any unique, rare, or endangered species of animals?	___	___	___
c. Introduction of new species of animals into an area, or result in a barrier to the migration or movement of animals?	___	___	___
d. Deterioration to existing fish or wildlife habitat?	___	___	___

6. Noise. Will the proposal result in:	Yes	Maybe	No
a. Increases in existing noise levels?	___	___	___

b. Exposure of people to severe noise levels? ___ ___ ___

7. Light & Glare Will the proposal produce new light or glare? ___ ___ ___

8. Land Use Will the proposal result in a substantial alteration of the present or planned land use of an area? ___ ___ ___

9. Natural Resources Will the proposal result in:	Yes	Maybe	No
a. Increase in the rate of use of any natural resources?	___	___	___
b. Substantial depletion of any non- renewable natural resource?	___	___	___

10. Risk of Upset Will the proposal involve:	Yes	Maybe	No
a. A risk of an explosion or the release of hazardous substances (including, but not limited to, oil, pesticides, chemicals, or radiation) in the event of an accident or upset conditions?	___	___	___
b. Possible interference with an emergency response plan or an emergency evacuation plan?	___	___	___

11. Population Will the proposal alter the location, density, distribution, or growth rate of the human population of an area? ___ ___ ___

12. Housing. Will the proposal affect existing housing, or create a demand for additional housing? ___ ___ ___

13. Transportation/Circulation. Will the proposal result in:	Yes	Maybe	No
a. Generation of substantial additional vehicular movement?	___	___	___
b. Effects on existing parking facilities, or demand for new parking?	___	___	___
c. Substantial impact upon existing transportation systems?	___	___	___
d. Alterations to present patterns of circulation or movement of people and/or goods?	___	___	___
e. Alterations to waterborne, rail, or air traffic?	___	___	___

f. Increase in traffic hazards to motor vehicles, bicyclists, or pedestrians?	___	___	___

14. Public Services. Will the proposal have an effect upon, or result in a need for new or altered governmental services in any of the following areas:	Yes	Maybe	No
a. Fire protection?	___	___	___
b. Police protection?	___	___	___
c. Schools?	___	___	___
d. Parks or other recreational facilities?	___	___	___
e. Maintenance of public facilities, including roads?	___	___	___
f. Other governmental services?	___	___	___

15. Energy. Will the proposal result in:	Yes	Maybe	No
a. Use of substantial amounts of fuel or energy?	___	___	___
b. Substantial increase in demand upon existing sources of energy, or require the development of new sources of energy?	___	___	___

16. Utilities. Will the proposal result in a need for new systems, or substantial alterations to the following utilities:	Yes	Maybe	No
a. Power or natural gas?	___	___	___
b. Communications systems?	___	___	___
c. Water?	___	___	___
d. Sewer or septic tanks?	___	___	___
e. Storm water drainage?	___	___	___
f. Solid waste and disposal?	___	___	___

17. Human Health. Will the proposal result in:	Yes	Maybe	No
a. Creation of any health hazard or potential health hazard (excluding mental health)?	___	___	___
b. Exposure of people to potential health hazards?	___	___	___

18. Aesthetics. Will the proposal result in the obstruction of any scenic vista or view open to the public, or will the proposal result in the creation of an aesthetically offensive site open to public view? ___ ___ ___

19. Recreation. Will the proposal result in an impact upon the quality or quantity of existing recreational opportunities? ___ ___ ___

20. Cultural Resources.	Yes	Maybe	No
a. Will the proposal result in the alteration of or the destruction of a prehistoric or historic archaeological site?	___	___	___
b. Will the proposal result in adverse physical or aesthetic effects to a prehistoric or historic building, structure, or object?	___	___	___
c. Does the proposal have the potential to cause a physical change which would affect unique ethnic cultural values?	___	___	___
d. Will the proposal restrict existing religious or sacred uses within the potential impact area?	___	___	___

21. Mandatory Findings of Significance	Yes	Maybe	No
a. Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?	___	___	___
b. Does the project have the potential to achieve short-term, to the disadvantage of long-term, environmental goals? (A short-term impact on the environment is one which occurs in a relatively brief, definitive period of time, while long-term impacts will endure well into the future.)	___	___	___
c. Does the project have impacts which are individually limited, but cumulatively considerable? (A project may impact on two or more separate resources where the impact on each resource is relatively small, but where the effect of the total of those impacts on the environment is significant.)	___	___	___
d. Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	___	___	___

ENVIRONMENTAL DOCUMENTATION

Environmental documentation means written documentation prepared in compliance with all applicable laws and guidelines related to the protection of the environment and resources of the State, including but not limited to CEQA (California only); NEPA; the Federal Clean Water Act; the California Fish and Game Code or Oregon Fish and Wildlife laws, including the California Endangered Species Act, or Oregon Endangered Species Act; and the Federal Endangered Species Act.

California Environmental Quality Act Process (CEQA) NO equivalent in Oregon

For complete information on the California Environmental Quality Act process, obtain a copy of the **California State Clearinghouse handbook** from the State of California, Governor's Office, Office of Permit Assistance, at 1400 Tenth Street, Sacramento, CA 95814, or by calling 916/322-4245.

National Environmental Policy Act (NEPA)

If the proposed projects are within federal jurisdiction, the project may be subject to NEPA-related documents. Consult with the water district's legal counsel for further information.

Type I - Is the project located in the areas listed?

Geographic Area	Agency	Permit
From 3 miles offshore to 1,000 yards inland	Coastal Commission	Coastal Development Permit
San Francisco, San Pablo, and Suisun bays from high water to 100 feet inland	San Francisco Bay Conservation and Development Commission	Development Permit
Suisun Marsh	San Francisco Bay Conservation and Development Commission	Marsh Development Permit
Lake Tahoe Watershed	Tahoe Regional Planning Agency	Development Permit
Floodways in the Central Valley	The Reclamation Board	Encroachment Permit
Navigable waterways or streams affecting navigable waterways	US Army Corps of Engineers	Section 10 Permit
Wetlands, including coastal and inland waters, lakes	US Army Corps of Engineers	Section 404 Permit for disposal of dredged material or placement of any fill material into wetlands, lakes, rivers, or tributaries
	Regional Water Quality Control Board	Section 401 Certification
Wild and Scenic Rivers	The Resources Agency	Approval of diversions; Finding of Compatibility

Type II: Does the project affect any of the resources listed

Resource	Agency	Permit
Air	Air Pollution Control districts	Authority to Construct and Permit to Operate for activities emitting pollutants to the atmosphere
Fish and Wildlife Habitat	U.S. Fish and Wildlife Service	Fish and Wildlife Agreements

	Department of Fish and Game	Stream or Lake Alteration Agreements for activities in streams or lakes and channels, and crossings spawning gravel protection
	Dept of Fish and Game	Fish and Wildlife Agreements
Water Rights	State Water Resources Control Board, Regional Boards	Permit to Appropriate and Statement of Diversion and Use fo Activities diverting surface water not previously appropriated
Water Quality	State Water Resources Control Board, Regional Boards	National Pollutant Discharge Permit or Waste Discharge Requirements for discharge to surface water
Wetlands, including coastal and inland waters, lakes, rivers	US Army Corps of Engineers	Permit for disposal of dredged material or placement of any fill material into wetlands, lakes, or tributaries
Navigable waters and tributaries to them	US Army Corps of Engineers	Permit for dredging filling, dock, groins, land jetties or for any obstruction or effect on the capacity of navigable waters
Navigable waters and tributaries to them	Federal Energy Regulatory Commission	FERC License
Beds of navigable waters	State Lands Commission	Land Use Lease for encroachments and docks
Endangered Species	US Fish and Wildlife Service	Incidental Take Permit
	Dept of Fish and Game	Incidental Take Permit
Drinking Water	Dept of Health Services	Title 22 Drinking Water Stds

Type III: Does the project involve any of the following activities?

Activity	Agency	Permit
Power plants and transmission lines	California Energy Commission	Notice of Intention and Application for Certification
Generation of electrical power	Federal Energy Regulatory Commission	FERC Permit
Conversion of timberland to other uses	Department of Forestry	Timberland Conversion Permit
Cancellation of a Williamson Act Open Space	The Resources Agency	Approval of the Waiver of a Contract Cancellation Fee
Bridge Construction	US Coast Guard	Permit for bridges and causeways over navigable waters
Mineral prospecting and extraction on State lands	State Lands Commission	Prospecting Permit and Extraction Lease
Oil or gas well	Department of Conservation, Division of Oil and Gas	Oil or Gas Well Permit
Geothermal well	Department of Conservation, Division of Oil and Gas	Geothermal Well Permit

Geothermal prospecting and development on State lands	State Lands Commission	Geothermal Prospecting Permit and Extraction Lease
Encroachment on or across a State highway	Department of Transportation	Encroachment Permit; Utility Encroachment Permit
Construction, alteration, maintenance, operation, and removal of dams or reservoirs	Department of Water Resources, Division of Safety of Dams	Approval of Plans
Construction or alteration of dams	Federal Energy Regulatory Commission	FERC. License
Dredging	Department of Fish and Game	Standard or Special Suction
Removal of sand, gravel, and dredge spoils from State owned lands	State Lands Commission	Grant or Privilege
Dredging or placement of fill or other materials or structure in wetlands	US Army Corps of Engineers	404 Permit
	Regional Water Quality Control Board	401 Certification
Water diversion from a State wild or scenic river	The Resources Agency	Determination of Need and No Adverse Effect
Surface mining	City or County	Reclamation Plan

TYPE IV: PROPERTY RIGHTS

Considerations

- Who owns or controls the land? (Private owner, lessee, public agency owner?)
- Does the water district have the landowner's permission?

RESOLUTION NO. _____

ADOPTION OF A WATER CONSERVATION PLAN FOR THE _____ DISTRICT

WHEREAS, Section No. 3405 (e) of the Central Valley Project Improvement Act of 1992 (Title XXXIV, Public Law 102-575, 106 Stat. 4713) requires the Secretary of the Interior to establish an office to develop criteria for evaluating water conservation plans developed by CVP contractors, and to evaluate the adequacy of plans submitted by project contractors by May 1, 1997; and

WHEREAS, Section 210 of the Reclamation Reform Act of 1982 (Public Law 97-293; 43 U.S § 390jj) requires districts with repayment or water supply contracts to develop and maintain water conservation plans containing definite goals, appropriate water conservation measures, and time schedules for meeting conservation objectives; and

WHEREAS, the _____ district has such a _____ contract and has therefore prepared a water conservation plan.

NOW THEREFORE, BE IT RESOLVED, that the Water Conservation Plan is adopted by the _____ district.

PASSED AND ADOPTED THIS _____ day of _____, 1997, by the following vote:

AYES Board member -

NOES Board member -

ABSTAIN Board member -

ABSENT Board member -

APPROVED _____
(Authorized Signature)

ATTEST _____
City Clerk

AGRICULTURAL WATER MANAGEMENT PLAN FORMAT

Step 1. Description of the District

Some data called for in these Criteria may not be available.
Include in the plan how the District will gather those data and have them available for the next plan update.

A. History

Date District formed: _____ Original Size: _____

Size & Irrigated Acres

	size (sq. miles)	population served	irrigated acres
Size at first USBR contract			
Size in 1976			
Size in 1986			
Size in 1996			

Water Supplies

Water Source	1976 AF	1986 AF	1996 AF
USBR Irrigation water			
state project water			
other imported water			
local surface water			
upslope drain water			
District groundwater			
private groundwater (est.)			
transferred water			
reclaimed water			
other			
TOTAL			

Contract Information

	date	AF	AF
First USBR contract		AG	Other
Contract renewal		AG	Other
1996 Information		AG	Other

Provide the annual entitlement under each right and/or contract.

source	AFY	contract #	contract restrictions
USBR			

Describe anticipated land use changes (agricultural to municipal, etc.)

_____

_____

Cropping Patterns

List crops with 5% or more of total acreage - Select from Appendix C, crop list (page 25).

1976	acres	1986	acres	1996	acres
misc. (<5%)		misc. (<5%)		misc. (<5%)	
TOTAL		TOTAL		TOTAL	

Evolving Irrigation Methods

List the 5 major irrigation methods (by acres) - Select from Appendix C, Irrigation Methods (p. 25).

1976	acres	1986	acres	1996	acres
all other		all other		all other	
TOTAL		TOTAL		TOTAL	

List the acreage of vegetable-germination irrigation methods used in the District

1986	acres	1996	acres
sprinkler		sprinkler	
cut length of run - 660 feet		cut length of run - 660 feet	
cut length of run - 330 feet		cut length of run - 330 feet	
gated pipe		gated pipe	
(?)		(?)	
TOTAL		TOTAL	

B. Location and Facilities

Conveyance System.

miles unlined - canal	miles lined - canal	miles piped	miles - other

Storage

Describe the District's storage facilities (regulating reservoirs, etc.), including capacity & location.

Spill Recovery System

Describe the District's spill recovery system.

Delivery System Operation

Describe whether the delivery system provides immediate, scheduled, rotation, or other delivery method.

Describe any restrictions on the District's water source(s).

restriction	agency imposing restriction	effect on District operations

Proposed changes or Additions to District Facilities and Operations for 1997-2002.

C. *Topography and Soils*

Describe the topography (e.g. hilly, flat, sloping to a water course) of the District. Discuss any impact of topography on District water management.

Soils

Provide District soil associations (contact NRCS for information).

soil association	est. acres	effect on water operations and management

Describe any limitations resulting from soil problems (e.g., salinity or high water table, sandy soils, low infiltration rates, etc.).within the District.

soil problem	est. acres	effect on water operations and management

D. Climate

Describe the general climate of the District (available from National Weather Service, etc.).

For weather data, specify the period of record (30 years recommended) and reference used.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
avg precip													
avg temp													
max temp													
min temp													

average wind velocity: _____ average wind direction _____

average annual frost free days: _____

Describe the impact of any microclimates on water management within the District.

E. Natural and Cultural Resources

Natural Resources within the District.

name	est. acres	description
sandy beach rapids	*200*	*spawning area* (example)

Indicate any management of these resources in the past or present by the District.

_____

_____

_____

Recreational and/or Cultural Resources

name	est. acres	description
Chumash village site	*50*	*river terrace with numerous house sites* (example)

F. Operating Rules and Regulations

Describe the District's water allocation policy.

_____

_____

_____

Provide the official and actual lead times necessary for water orders and shut-off.

_____

_____

_____

Describe the District's return-flows and drainage policies.

_____

_____

_____

Describe the District's policies on water transfers by the district and it's customers.

_____

_____

_____

G. Water Measurement and Accounting Procedures

total # of customers _____ total # of measured customers _____

total # of customer turnouts _____ total # of measured turnouts _____

Provide the number of each type of measurement device used by the District and maintenance schedule

type	number	accuracy (percentage)	reading (days	calibration (months	maintenance (months)
orifices					
propeller meters					
weirs					
flumes					
venturi meters					
pump, run time					
pump, KWH					
TOTAL					

Describe the District's water-use data accounting procedures, including how records are kept and archived, availability of water use data to customers, and how many years of customer water use records are available.

Water Pricing and Billing Practices

Describe the basis for water charges

Describe the District's water charges (include per-acre assessments, stand-by changes, quantity charges, etc.), and dollar amounts. If water use is billed by quantity describe the rate structure (e.g., declining, uniform or increasing block).

H. Water Shortage Allocation Policies

Describe (or attach) District's water shortage policies that include: How reduced water supplies and hardship water are allocated.

Describe (or attach) District policies that address wasteful use of water. Include information on enforcement methods.

Step 2. Inventory Water Resources

Some data called for in these Criteria may not be available.
Include in the plan how the District will gather those data and have them available for the next plan update.

A. Surface Water Supply

Acre-foot amounts of surface water delivered to the District by each of the District's sources
Complete Table 1, Page Tables - Page 1

Provide the amount of water received under each right and/or contract for the last 10 years
Complete Table 8, Page Tables - Page 8

B. Ground Water Supply

Describe any ground water basin(s) that underlie the District

name	size (sq. mi.)	usable capacity (AF)	safe yield (AFY)

Provide a map locating District operated wells, and managed ground water recharge areas

If there is conjunctive use of surface & ground water, describe it.

_____

_____

For managed ground water basins, attach a copy of the management plan

C. Other Water Supplies

source	amount (AFY)	length of contract	use
TOTAL			

D. Source Water Quality Monitoring Practices

Describe any surface water or ground water quality problems, and how the quality problems limit the use of the water or affect customer use decisions

Describe any water quality monitoring programs for surface water.

analyses performed	concentrations		frequency
	range	average	

Describe any water quality monitoring programs for ground water.

analyses performed	concentrations		frequency
	range	average	

Identify which agencies conduct the water testing and describe the District's role in the program

E. Water Uses within the District

1. Agricultural

Provide information on crops grown in 1996 (cultivated on 5% or more of 1996 total irrigated acreage)

crop name: _____
irrigation methods acreage

crop name: _____
irrigation methods acreage

crop name: _____
irrigation methods acreage

crop name: _____

irrigation methods acreage

crop name: _____

irrigation methods acreage

Summarize types of irrigation systems (methods) used in the district (1996).

irrigation methods acreage

2. ~~*Municipal and Industrial*~~
3. ***Ground Water Recharge***

Describe any District operated ground water recharge areas (as identified in Step 2B).

Recharge Area	Method of recharge	1991 recharge (AF)	1996 (AF)
	TOTAL		

4. *Transfers and Exchanges*

Transfers refer to water exchanges, sales or other agreements that transfer or exchange water between water users, such as: 1) agriculture to M & I, 2) M & I to agriculture, and 3) agriculture to agriculture.

For transfers within District, list agriculture to M & I and M & I to agriculture transactions.

from whom	to whom	1989 (AF)	1991 (AF)	1996 (AF)	Use
TOTAL					

For transfers into or out of the District, list all transactions.

from whom	to whom	1989 (AF)	1991 (AF)	1996 (AF)	Use
TOTAL					

Describe any trades, wheeling or other transactions.

---

5. Other

Other uses	1989 (AF)	1997 (AF)
TOTAL		

F. Drainage from the District

Identify, to the extent possible, where surface and subsurface return flows go.

If return flows leave the District's service area and are reused, identify the location and type of that reuse, if known.

location of reuse	type of reuse	1991 (AF)	1996 (AF)
TOTAL			

Describe any drainage water quality testing program.

analyses performed	concentrations		frequency
	range	average	

Describe the District's role in the drainage testing program.

_____

_____

Describe any usage limitation resulting from the drainage water quality

constituent	usage limitation

G. Water Accounting (Inventory*)*

1. Quantify District Water Supplies

To complete this section enter the necessary data in the listed Tables.

2. Quantify Water Used

To complete this section enter the necessary data in the listed Tables.

3. Overall Water Inventory:

Compare total water supplies entering the District with total water leaving the District. (Table 6)

The forms for Step 3 are not designed to provide fill-in space for all of the necessary information. The fill-in spaces provided are considered essential "starting" information and the District's plan should include appropriate additional information.

A. Critical Best Management Practices for Agricultural Contractors

1. Measure, with a device that is rated to have a maximum error of ± six percent, the volume of water delivered by the District to each customer

total # of unmeasured customer turnouts _____

number of measurement devices installed in 1996 _____

number of measurement devices installed in 1997 _____

number of measurement devices to be installed in 1998 _____

types of measurement devices to be installed	accuracy	total to be installed

2. Adopt a water pricing structure for District water users based at least in part on quantity delivered

If a water pricing structure based in part on quantity delivered is not in place, describe the proposed or newly adopted quantity based water pricing structure and when it was or will be implemented.

_____

_____

_____

_____

_____

3. Designate staff responsible for development and implementation of the water management plan.

Name _____ Title _____

Address _____

Telephone _____ Fax _____ E-mail _____

4. ***Provide or support the availability of the following water management services for water users:***

a. ***<u>On-farm irrigation and drainage system evaluations (e.g., Mobile Labs)</u>***

Total number of irrigated acres:	
Number of irrigated acres to be surveyed per year by on-farm irrigation evaluations:	
Total number of farms:	
Number of farms to be surveyed per year by on-farm irrigation & drainage evaluations:	

Describe the extent to which District on-farm irrigation and drainage system evaluation recommendations are implemented by growers.

b. ***<u>Normal year and real-time irrigation scheduling and crop ET information (e.g., CIMIS)</u>***

Describe the District's irrigation scheduling assistance program, including methods of data dissemination, and list any cooperating agencies.

c. ***<u>Surface, ground and drainage water quantity and quality data</u>***

Describe the District's surface, ground and drainage water quality monitoring program, including methods of data dissemination, and list any cooperating agencies.

d. ***<u>Educational programs and materials for farmers, staff, and public</u>***

Describe the District proposed or supported educational programs and their goals. Attach the materials used in these programs.

program	co-funders	goals

B. Exemptible Best Management Practices for Agricultural Contractors

1. ***Distribution system lining/piping*** - line or pipe distributions systems to increase distribution system flexibility and capacity, decrease maintenance and reduce seepage

canal/ditch (reach)	unlined/ lined	# of miles in reach	est. seepage (AFY)

2. ***Construct or line regulatory reservoirs*** - construct regulatory reservoirs to improve distribution system delivery flexibility.

reservoir name	annual spill in section (AFY)	est. spill recovery (AFY)

3. ***Distribution control*** - modify distribution facilities and controls to increase the reliability, consistency and flexibility of water deliveries

Estimate annual operation spills. Identify locations for automated canal structures and other distribution system improvements. Estimate annual water savings (AFY) resulting from the evaluated projects.

4. ***Reuse systems*** - construct facilities to capture and reuse District operational spills

lateral	annual spill (AFY)	est. spill recovery (AFY)

5. ***Incentive pricing*** - implement a pricing structure, such as tiered-block pricing, which promotes one or more of the following goals: a) encouraging more efficient water use at the farm level, b) supporting planned conjunctive use of groundwater, c) increasing groundwater recharge, d) reducing problem drainage, and e) improved management of environmental resources

6. **On-farm program incentives** - facilitate and/or provide financial incentives and assistance for improved on-farm water management

Identify District programs to facilitate and/or provide financial incentives for improved on-farm water management. Include information on the estimated amount of yearly loans.

7. ***Conjunctive use*** - increase planned conjunctive use of surface/groundwater within District

Describe the potential for increased conjunctive use and identify programs to achieve this potential.

8. ***Land management*** - facilitate alternative uses for lands with exceptionally high water duties, or whose irrigation contributes to significant problems

Drainage Characteristic	acreage	potential alternate use
High water table (<5')		
Poor drainage		
GW Se Concentration > 50 ppb		
Poor productivity		

9. ***Pump efficiency evaluations*** - coordinate the evaluation of District and private pumps with local utilities, evaluating both energy and water efficiency

Describe the pump efficiency evaluation program and the role of the District and participating local utilities in the program.

10. ***Operational practices and procedures*** - evaluate potential District, state and federal policy and institutional changes that could allow more flexibility in water delivery and carry-over storage.

Identify District policies that limit improved end-user water management.

Describe actions the District can take to overcome these limitations.

Step 5. Exemption Process

BMP considered for exemption: _____ Applicability (see Appendix B)

Proposed reason for exemption: _____

cost-effectiveness

Include or attach a benefit-cost analysis which demonstrates that the costs to the District outweigh the benefits to the District over the life of the measure. Perform the analysis by comparing the present value of all benefits to the present value of all costs. Document the projected/estimated benefits and costs and the methodology for analysis (benefits and costs should be quantified to the extent possible). Perform the analysis from the District perspective and include al least the benefits and costs listed in the September 1996 *Criteria for Evaluating Water Management Plans*

financial feasibility

Document the following:

1. The benefits and costs of the BMP to the District; and
2. The District funding needed to implement the cost-effective BMPs; and
3. A discussion regarding why the District cannot finance the BMP through rate adjustments, assessments, etc.; and
4. A discussion of the District's reasonable efforts to secure funding from other entities which include, but are not limited to, lending institutions and bonding authorities and an explanation of why these entities would not provide funding; and
5. The required amount of a grant or subsidy that would be needed to feasibly implement the BMP if financing or partnerships could not be obtained.

environmental constraints

Document the critical environmental issues and known (qualitative and/or quantitative) negative impacts of the BMP and an explanation of why effective mitigation of these impacts is not possible. If mitigation of the environmental impacts is possible, the practice must be implemented unless it can be exempted by another exemption category. For example, if the mitigation costs make the project economically infeasible, a discussion of the mitigation plan and necessary mitigation costs should be included as a part of the economic analysis.

legal constraints

Detail the following:

1. A list of any known laws, regulations, court decisions, or other legal constraints that make it illegal for the District to implement the BMP; and
2. A list of the steps that would be required to remove these constraints; and
3. A description of what steps the District has taken to remove these constraints; and
4. Documentation of efforts by the District to work with other entities that would have the legal authority to carry out the BMP within the District's service area.

Attachment A
Information required of Districts located in the drainage problem area

District's included in the drainage problem area, as identified in *A Management Plan for Agricultural Subsurface Drainage and Related Problems on the Westside San Joaquin Valley (September 1990),* are listed, by sub-area, below. If future editions of the drainage report revise the boundaries of the drainage problem area or other factors used to determine which districts are in the drainage problem area, Reclamation will revise Attachment A to conform with the current drainage report.

1. Reclamation districts in the **Grasslands Subarea**: Broadview WD, Central California ID, Del Puerto WD, Firebaugh Canal WD, Mercy Springs WD, Pacheco WD, Panoche WD, San Luis Canal Company, San Luis WD.

2. Reclamation districts in the **Westlands Subarea**: James ID, Tranquillity ID and Westlands WD.

3. Reclamation districts in the **Tulare Subarea**: Alpaugh ID, Atwell Island WD, Lower Tule River ID, and Pixley ID.

4. Reclamation districts in the **Kern Subarea**: Alpaugh ID.

Districts listed above shall describe which recommendations prescribed in *A Management Plan for Agricultural Subsurface Drainage and Related Problems on the Westside San Joaquin Valley (September 1990)* have been incorporated in their water conservation programs to improve conditions in drainage problem areas. These recommendations include:

1. Source Control
2. Land Retirement
3. Drainage Water Treatment
4. Drainage Water Reuse
5. Shallow Groundwater Pumping
6. Evaporation Ponds

Provide a description and level of expenditure for each activity designed to address the recommendations of the San Joaquin Valley Drainage Program. Identify how implementation of the recommendations has or will substantially reduce deep percolation on drainage problem lands. Describe which recommendations have not been implemented and why.

Attachment B
Non-Applicability (N/A) of Exemptible BMPs

To establish that a BMP is not applicable to the District, the Plan should explain the reasons why the BMP does not apply to the District. This justification must be consistent with Step 1 of the Criteria titled, "Describe the District." Examples of non-applicability for each exemptible BMP are listed below. This list is not all inclusive.

Step 3, B. Exemptible Best Management Practices for Agricultural Contractors

1. **Distribution system lining/piping** - NA could include: completely piped systems, unlined systems or sections of systems which are used as part of a planned conjunctive use program;
2. **Regulatory reservoirs** - NA could include: completely piped systems which do not have delivery constraints;
3. **Distribution control** - NA could include: completely piped systems which do not have delivery constraints;
4. **Reuse systems** - NA could include: completely piped systems which do not have delivery constraints;
5. **Incentive pricing** - None identified;
6. **On-farm program incentives** - None identified;
7. **Conjunctive use** - NA could include: districts which do not overlie a useable ground water basin and thus neither the district nor its customers pump or use ground water;
8. **Land management** - NA could include: districts without irrigable lands that have exceptionally high water duties or whose irrigation does not contribute to significant problems;
9. **Crop & field** - NA could include: districts where are least 50 percent of the customers irrigate crops with non-district water;
10. **Pump efficiency evaluations** - NA could include: districts where neither the district nor its customers use ground water pumps, lift pumps, pressure pumps, filter pumps, etc.;
11. **Operational practices and procedures** - None identified.

Attachment C

Crop List

barley
corn - field
oats
rice
sorghum
wheat
other cereals

alfalfa
clover
irrigated pasture
other hay
silage
other forage

cotton
hops
safflower
sugar beats
soybeans
other field crops

asparagus
beans
broccoli
cabbage
carrots
cauliflower
celery
corn
cucumbers
garlic
greens
lettuce
melons
onions
peas
peppers
potatoes
squash
tomatoes
other vegetables

Sudan grass
Bermuda grass
other grasses

apples
apricots
avocados
berries (all kinds)
cherries
grapefruit
lemon / limes
oranges / tangerines
dates
grapes
olives
peaches
pears
prunes / plums
strawberries
other fruits

almonds
pecans
pistachios
walnuts
other nut trees

ornamental nursery
joboba
other

Irrigation Methods List

Level Basin, 1/4 mile
Level Basin, 1/8 mile
Graded, surface 1/2 miles
Graded, surface 1/4 miles
Graded, surface 1/8 mile
Sprinkler, center pivot
Sprinkler, linear move
Sprinkler, solid set
Sprinkler, hand move
Trickle, spray
Trickle, subsurface
Trickle, surface

AGRICULTURAL WATER ACCOUNTING TABLES

Table 1

1996 - Surface Water Supply

Month	USBR Agric. acre-feet	State Project acre-feet	Local Water Supply acre-feet	Upslope Drain Water acre-feet	Total acre-feet
January					
February					
March					
April					
May					
June					
July					
August					
September					
October					
November					
December					
TOTAL					

Transfer the Total Surface Water Supply to Table 3

Water District Name (Agricultural Water Suppliers ONLY)

Table 2

1996 - Ground Water Supply

Month	Pumped by District			Pumped by District Customers			Total
	Basin 1 acre-feet	**Basin 2** acre-feet	**Basin 3** acre-feet	**Basin 1** acre-feet	**Basin 2** acre-feet	**Basin 3** acre-feet	acre-feet
January							
February							
March							
April							
May							
June							
July							
August							
September							
October							
November							
December							
TOTAL							

Transfer the Total Ground Water Supply to Table 3

Table 3

1996 - Water Supplies

Month	Surface Water acre-feet	Ground Water acre-feet	Effective Precipitation acre-feet	Reclaimed Water acre-feet	Other acre-feet	Total acre-feet
January						
February						
March						
April						
May						
June						
July						
August						
September						
October						
November						
December						
TOTAL						

Transfer the Total Water Supply to Table 6

Table 4

1996 - Conveyance System Losses

Reach or Lateral	**Length** miles	**Seepage** acre-feet	**Evaporation** acre-feet	**Operational Spills** acre-feet	**Total Losses** acre-feet
TOTAL					

Transfer the Total Conveyance Losses to Table 6

Table 5

1996 - Crop Water Needs

Crop	Area crop acres	Planting month	Growing Season Harvest month	Crop ET AF per acre	Leaching +Requirement AF per acre	Cultural +Practices AF per acre	=	Crop Water Needs acre-feet
all other misc.								
TOTAL Crop Acres								

Total Irrigated Acres _____ (Due to double cropping Total irrigated Acres is usually less than the Total Crop Acres)

Transfer the Total Crop Water Needs to Table 6

Table 6

1996 - Overall Water Budget

Step 2 A 1996 Water Supply		from Table 3		_____
District Beneficial Uses				
2 A 2 e	Environmental Consumptive Use		minus	_____
2 C 3	Ground Water Recharge	(planned)	minus	_____
2 C 4	Water Exchanges or Transfers		plus or minus	_____
			WATER SUPPLY AVAILABLE FOR USE	_____
District Non-Beneficial Uses				
2 A 2 a	Conveyance System Seepage	Table 4	minus	_____
2 A 2 a	Conveyance System / Reservoir Evaporation	Table 4	minus	_____
2 A 2 a	Conveyance System Spills		Table 4	minus ___
2 A 2 d	Consumptive Use by Riparian Vegetation	(estimate)	minus	_____
			WATER SUPPLY AVAILABLE FOR SALE TO CUSTOMERS	_____
			QUALITY OF WATER ACTUALLY SOLD TO CUSTOMERS	_____
2 C 1	Crop Water Needs	Table 5	minus	_____
2 D	On-farm Drain/Spill Water Leaving the District	(estimate)	minus	_____
2D	Deep Percolation	(calculated)	EQUALS	_____

Table 7

Deep Percolation and Conveyance Seepage

	1996 acre-feet or acres
Deep Percolation (Table 6)	AF
Conveyance Seepage (Table 4)	AF
Total of Deep Percolation + Conveyance Seepage	AF
Irrigated acres	acres
Irrigated acres over a perched water table	acres
Irrigated acres over a saline sink	acres
Portion of Deep Percolation / Conveyance Seepage flowing to a perched water table	AF
Portion of Deep Percolation / Conveyance Seepage flowing to a saline sink	AF
Total (AF) flowing to a perched water table or saline sink	**AF**

Table 8

Annual Water Quantities Delivered Under Each Right or Contract

Year	USBR	USBR (Class II)	SWP (Contract)	Local Supply	TOTAL
1987					
1988					
1989					
1990					
1991					
1992					
1993					
1994					
1995					
1996					
Total					
Average					

M&I WATER MANAGEMENT PLAN FORMAT

Step 1. Description of the District

Some data called for in these Criteria may not be available.
Include in the plan how the District will gather those data and have them available for the next plan update.

Water Management Plans shall describe the District history, location and facilities, size, terrain and soils, environment, climate, operating rules and regulations, customer water delivery measurements, water rate schedules and billing, and water shortage allocation policies. For data not available during the preparation of this plan, the District shall describe how the information will be obtained for the next Plan update.

A. History

Give an historical overview of the District. Provide a timeline which includes the formation of the District, original size, water supplies, contract information with Reclamation and others, and changes in land use.

Date District formed:

Size

	size (sq. miles)	population served
Size at first USBR contract		
Size in 1976		
Size in 1996		

Water Supplies

Water Source	1976 AF	1986 AF	1996 AF
USBR M&I water			
state project water			
other imported water			
local surface water			
District groundwater			
private groundwater (est.)			
transferred water			
reclaimed water			
other			
TOTAL			

Contract Information

	date	AF	AF
First USBR contract		M&I	Other
Contract renewal		M&I	Other

1996 Information		M&I	Other

Provide the annual entitlement under each right and/or contract.

source	AFY	contract #	contract restrictions
USBR			

Describe past and anticipated future land use changes

B. Location and Facilities

Describe the water conveyance and delivery system within the District service area (pipelines, etc.), storage facilities (e.g., reservoirs, regulating reservoirs, etc.). Describe any restrictions on the District's water source(s) and proposed changes that will be implemented in the next five years.

Conveyance System.

miles AC pipe	miles steel pipe	miles cast iron pipe	miles - other

Storage

Describe the District's storage facilities (reservoirs, regulating reservoirs, etc.), including capacity & location.

Describe any restrictions on the District's water source(s).

restriction	agency imposing restriction	effect on District operations

Proposed changes or Additions to District Facilities and Operations for 1997-2002.

C. Topography and Soils

Describe the topography of the District (e.g., hilly, flat, sloping to a water course, etc.). Indicate the impact of topography on water operations and management within the District. Describe any soil limitations that affect the use of water (e.g., salinity or high water table, extremely sandy soils, low infiltration rates, etc.).

Describe the topography (e.g. hilly, flat, sloping to a water course) of the District. Discuss any impact of topography on District water management.

Describe any limitations resulting from soil problems (e.g., salinity or high water table, sandy soils, low infiltration rates, etc.).within the District.

soil problem	est. acres	effect on irrigation management

D. Climate

Describe the general climate of the District. Include average precipitation, maximum and minimum temperatures, average wind velocity and direction and frost free days. If, within the District, there are known areas with significantly different microclimates, describe how these affect water management decisions and operations.

Describe the general climate of the District (available from National Weather Service, etc.).

For weather data, specify the period of record (30 years recommended) and reference used.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
avg precip													
avg temp													
max temp													
min temp													

Describe the impact of any microclimates on water management within the District.

E. Natural and Cultural Resources

Describe any known natural resources (e.g., wetlands, rivers, streams, lakes, fisheries, threatened plant and animal communities, spawning grounds, flyways, etc.) within the District boundaries. Indicate any management of these resources in the past or present by the District. Describe any known recreational and/or cultural resources within the District.

Natural Resources within the District.

name	est. acres	description
sandy beach rapids	*200*	*spawning area* (example)

Indicate any management of these resources in the past or present by the District.

Recreational and/or Cultural Resources

name	est. acres	description
Chumash village site	*50*	*river terrace with numerous house sites* (example)

F. Operating Rules and Regulations

Describe or attach a copy of the District's operating rules and regulations.

G. Water Measurement and Accounting Procedures

List the total number of connections, the number currently measured and the percentage of customer water deliveries measured. List the types and numbers of meters - accuracy, frequency of calibration, and maintenance and reading schedule.

total # of customers

total # of measured customers

total # of unmeasured customers

type	number	accuracy (percentage)	reading (days)	calibration (months)	maintenance (months)
M & I meters - 5/8-3/4"					
M & I meters - 1"					
M & I meters - 1 1/2"					
M & I meters - 2"					
M & I meters - 3"					
M & I meters - 4"					
M & I meters - 6"					
M & I meters - 8"					
M & I meters - 10"					
Compound					
Turbo					
Other					
Other					
TOTAL					

Describe the District's water-use data accounting procedures, including how records are kept and archived, availability of water use data to customers, and how many years of customer water use records are available.

Water Pricing and Billing Practices

A copy of the District's operating rules and regulations will suffice if they include: basis for water charges (e.g., by customer class, by quantity, flat rate, etc.).

Describe the basis for water charges

Describe the District's municipal water charges - include dollar amounts for stand-by and quantity charges. If water use is billed by quantity describe the rate structure (e.g., declining, uniform or increasing block).

Include the billing frequency (e.g., monthly, bimonthly, annually, etc.), bill format and a description of the record management system

H. Water Shortage Allocation Policies

Attach a copy of the District's water shortage policies.

Describe (or attach) District's water shortage policies that include: How reduced water supplies are allocated.

Describe (or attach) District policies that address wasteful use of water. Include information on enforcement methods.

Step 2. Inventory Water Resources

Some data called for in these Criteria may not be available.
Include in the plan how the District will gather those data and have them available for the next plan update.

Describe the District's surface water supply, ground water supply, other water supplies, source water quality monitoring programs, water uses within the District, urban waste water disposal, and a water inventory.

A. Surface Water Supply

Describe the acre-foot amounts delivered to the District by each of the District's surface sources for the specified years. Describe any water quality limitations or management concerns associated with the identified water sources. Provide the amount of water received under each right and/or contract for the last 10 years.

Acre-foot amounts of surface water delivered to the District by each of the District's sources

Complete Table 1, Page Tables - Page 1

Provide the amount of water received under each right and/or contract for the last 10 years

Complete Table 8, Page Tables - Page 7

B. Ground Water Supply

Describe the general characteristics of the ground water basin(s) that underlie the District. Provide a map locating District operated water wells, and managed ground water recharge areas. If there is conjunctive use of surface & ground water, describe the program. For managed ground water basins, attach a copy of the management plan.

Describe any ground water basin(s) that underlie the District

name	size (sq. mi.)	usable capacity (AF)	safe yield (AFY)

Provide a map locating District operated water wells, and managed ground water recharge areas

If there is conjunctive use of surface & ground water, describe it.

For managed ground water basins, attach a copy of the management plan

C. Other Water Supplies

Identify any long-term water supplies not described above (e.g., reclaimed urban waste water, transfer agreements with other Districts, etc.).

Describe District long-term water supplies not described above.

source	amount (AFY)	length of contract	use
TOTAL			

D. Source Water Quality Monitoring Practices

Describe any surface water or ground water quality problems, and how the quality problems limit the use of the water. If water quality problems exist, describe the water quality testing program (frequency of measuring and analyses performed) and which agencies conduct the water testing. Also describe the District's role in the program.

Describe any surface water or ground water quality problems, and how the quality problems limit the use of the water

Describe any water quality monitoring programs for surface water.

analyses performed	concentrations		frequency
	range	average	

Describe any water quality monitoring programs for ground water.

analyses performed	concentrations		frequency
	range	average	

Identify which agencies conduct the water testing and describe the District's role in the

program

E. Water Uses within the District

1. ~~Agricultural~~

2. Municipal and Industrial:

Describe the municipal and industrial water use, by customer type, within the District. Describe, where applicable, the waste water collection and treatment systems, recycled water uses and methods of disposal.

Customer type	# of Connections	1996 use (AF)
Single Family		
Multifamily		
Commercial		
Industrial		
Public Agency		
M&I Irrigation		
Wholesale		
Construction		
Reclaimed		
Other (specify)		
Unaccounted for		
TOTAL		

M&I Waste Water Collection & Treatment Systems serving the entire District service area

treatment plant	treatment level (1, 2, 3)	1996 (AF)	disposal to:
	TOTAL		
Total discharged to ocean /	saline sink		

M&I Reclaimed Water

treatment plant	treatment level (1, 2, 3)	1996 (AF)	types of users:
	TOTAL		

3. Ground Water Recharge

List the quantity of water used for planned and incidental ground water recharge, include the method of recharge.

Describe any District operated ground water recharge areas (as identified in Step 2B).

Recharge Area	Method of recharge	1991 recharge (AF)	1996 (AF)
	TOTAL		

4. Transfers and Exchanges

Describe the source and quantity of water that was transferred and/or exchanged into or out of or within the District, and for what uses. Describe any other water transactions, such as trades, wheeling, etc.

Transfers refer to water exchanges, sales or other agreements that transfer or exchange water between water users, such as: 1) agriculture to M & I, 2) M & I to agriculture, and 3) M & I to M & I.

from whom	to whom	1989 (AF)	1991 (AF)	1996 (AF)	Use
TOTAL					

Describe any trades, wheeling or other transactions.

_____

_____

_____

5. Other

Describe any other uses of water.

Other uses	1989 (AF)	1996 (AF)
TOTAL		

G. *Water Accounting* (Inventory)

Develop a water inventory for the District based on 1996.

1. *Quantify District Water Supplies*

To complete this section enter the necessary data in the listed Tables.

a. *All surface water supplies, imported and originating within the District, by month. Table 1*
b. *Ground water extracted by the District, by month.* Table 2
c. *Effective precipitation by month.* Table 3
d. *Estimated ground water extracted by non-District parties (if records are not available, provide an estimate and basis for estimation).* Table 2
e. *Recycled water, by month.* Table 3
f. *Other supplies, by month.* Table 3

2. *Quantify Water Used*

To complete this section enter the necessary data in the listed Tables.

a. *Conveyance losses, include leaks and breaks.* Table 4
~~b. *Consumptive use by riparian vegetation.* Table 6~~
~~c. *Applied water, crop evapotranspiration, water used for leaching, and water used for cultural practices (e.g., frost protection, soil reclamation, etc.)* Table 5~~
d. *Municipal and industrial water use.*
e. *Ground water recharge.* Table 6
f. *Water exchanges and transfers.* Table 6
~~g. *Estimated deep percolation within the District.* Table 7~~
~~h. *Flows to perched water table or saline sink.* Table 7~~
i. *Total M&I waste water treated and discharged:*
~~j. *Spill or drain water leaving the District.* Table 6~~
k. *Other.* Table 6

3. *Overall Water Inventory:* Compare total water supplies entering the District with total water leaving the District. (Table 6)

~~*Step 3. Best Management Practices for Agricultural Contractors*~~

Step 4. Best Management Practices for Municipal and Industrial Contractors

This part of the plan identifies District-specific programs to accomplish the BMPs. It is understood that programs developed by wholesale agencies may not be implemented at the retail customer level, except within the District's retail service area. For the purposes of these Criteria, the plan needs to describe the program that the District thinks will best accomplish the practice. The development and implementation of the BMPs in a wholesaler's plan is the responsibility of Reclamation's contractor.

The success of some of the practices will depend on cooperative work with other entities. It is recognized that there may be constraints to successful implementation of planned programs. Monitoring and updating will allow the District to modify any planned programs that do not accomplish the practice as designed.

The forms for Step 3 are not designed to provide fill-in space for all of the necessary information. The fill-in spaces provided are considered essential "starting" information and the District's plan should include appropriate additional information.

A. Critical Best Management Practices for Municipal and Industrial Contractors

This section lists the BMPs that all Districts will implement or are already implementing. Provide a description of the implementation plan and include time schedules, budgets and monitoring plans. Each District shall also complete and submit the California Urban Water Conservation Council annual report form. If a BMP is to be studied please provide details and schedules of the study.

1. Distribution system water audits, leak detection and repair

Describe the districts current or planned distribution system water audit, and leak detection/repair program. If this BMP is not on-going, include a time schedule and yearly budget to implement this program system wide at regular intervals.

2. Metering with commodity rates for all new and existing connections

Describe the districts current or planned program to meter and bill by quantity all new and existing customers. If this BMP is not complete, include a time schedule and yearly budget to achieve 100 percent metering and commodity billing.

3. *Landscape efficiency requirements for new/existing commercial, industrial, institutional, governmental and multi-residential developments.*

Describe the districts current or planned efficient landscape ordinance or regulations. If this BMP is not complete, include a time schedule and budget necessary to adopt and implement the regulations.

4. *Public information*

Describe the districts current or planned program to promote water-use efficiency to the District's customers. If this BMP is not on-going, include a time schedule and yearly budget that will result in an effective public information program.

5. *School education*

Describe the districts current or planned program to conduct water conservation education in schools within the District. If this BMP is not on-going, include a time schedule and yearly that will result in an effective program with broad impact.

6. *New commercial, industrial and institutional (CII) water use review*

Describe the District's current or planned program to assist CII customers to be water efficient. If this BMP is not on-going, include a time schedule and yearly budget that will result in New CII customers receive this assistance.

7. Conservation pricing - water and sewer service

Describe the districts current or planned program to promote efficient water-use through an incentive pricing structure. If this BMP is not complete, include a time schedule and yearly budget necessary to design and adopt an incentive pricing program for water and sewer service.

8. Water waste prohibition

Describe the districts current or planned waste water prohibitions. If this BMP is on-going, include a time schedule and budget necessary to achieve adopt and enforce waste water regulations.

9. Demand management staff

Identify the District's staff member responsible for development and implementation of the USBR Water Conservation Plan.

10. Financial incentives

Describe the incentives offered by the District to insure that the BMPs are effective implemented by the District's customers.

B. Exemptible Best Management Practices for Municipal and Industrial Contractors

Each District shall develop a program to implement the following BMPs unless the District demonstrates that the practice does not make sense for the District to implement. Districts may spend time studying the most effective way to implement a BMP or whether a BMP is appropriate for a District. For appropriate BMPs, provide a description of the implementation plan and include time schedules, budgets and monitoring plans. If a BMP is to be studied, provide details and schedules of the study. These studies must be completed expeditiously and before the next Plan update. Districts should follow the exemption criteria (see Step 5) to justify exemptions and provide the exemption in this Step. See Attachment B for examples of circumstances under which BMPs are not applicable.

1. ***Interior and exterior water audits and incentive programs for single family residential, multi family residential, and governmental/institutional customers***

Current Program- describe audit components, method of program promotion, incentives offered to reach implementation target, etc.

Identification of potential specific program designs- include types of audits, incentives considered, etc.

Evaluation of specific designs- include factors which determined specific program design selected by District

Description of specific program - include program goals, budget and how results will be monitored

2. ***Plumbing, new & retrofit*** - Implement programs to retrofit ULF toilets and/or high efficiency showerheads in existing buildings.

Current Program- identify number of customers, method of program promotion, incentives offered to reach implementation target, number of customers retrofitted, etc.

Identification of potential specific program designs- include types of incentives, devices considered, etc.

Evaluation of specific designs- include factors which determined program design selected by District

Description of District's program - include program goals, budget and how results will be monitored

3. Large landscape water audits and incentives

Current Program- identify number of large landscapes, method of program promotion, incentives offered to reach implementation target, number of landscapes audited each year, etc.

Identification of potential specific program designs- include types of promotion and incentives, etc.

Evaluation of specific designs- include factors which determined program design selected by District

Description of District's program - include program goals, budget and how results will be monitored

4. Commercial, industrial and institutional conservation - Conduct commercial and industrial water conservation audits, water use reviews, and incentive programs for existing customers.

Current Program- total number of CII customers and number of CII audited each year and total to date, method of program promotion, yearly target and incentives offered to reach target, results, etc.

Identification of potential specific program designs- include types of promotion and incentives, etc.

Evaluation of specific designs- include factors which determined program design selected by District

Description of District's program - include program goals, budget and how results will be monitored

5. ***Landscape water conservation for new and existing single family homes*** - Provide landscape water conservation audit and incentive programs for new and existing customers.

Current Program- number of single family customers and number audited each year and total to date, method of program promotion, yearly target and incentives offered to reach target, results, etc.

Identification of potential specific program designs- include types of promotion and incentives, etc.

Evaluation of specific designs- include factors which determined program design selected by District

Description of District's program - include program goals, budget and how results will be monitored

6. ***Ultra low flush toilet installation program***

Current Program- projected number of non-ULF toilets and total installed to date, method of program promotion, yearly target and incentives offered to reach target, results, etc.

Identification of potential specific program designs- include types of promotion and incentives, etc.

Evaluation of specific designs- include factors which determined program design selected by District

Description of District's program - include program goals, budget and how results will be monitored

Step 5. Exemption Process

Some BMPs are not appropriate or possible for some Districts to implement. To document an exemption provide the basis, rationale, and details for excluding a BMP; such documentation shall address, as appropriate, cost-effectiveness, financial feasibility, and environmental or legal constraints to BMP implementation.

BMP considered for exemption:

Proposed reason for exemption:

cost-effectiveness

Include or attach a benefit-cost analysis which demonstrates that the costs to the District outweigh the benefits to the District over the life of the measure. Perform the analysis by comparing the present value of all benefits to the present value of all costs. Document the projected/estimated benefits and costs and the methodology for analysis (benefits and costs should be quantified to the extent possible). Perform the analysis from the District perspective and include al least the benefits and costs listed in the September 1996 *Criteria for Evaluating Water Management Plans*

financial feasibility

Document the following:

1. The benefits and costs of the BMP to the District; and
2. The District funding needed to implement the cost-effective BMPs; and
3. A discussion regarding why the District cannot finance the BMP through rate adjustments, assessments, etc.; and
4. A discussion of the District's reasonable efforts to secure funding from other entities which include, but are not limited to, lending institutions and bonding authorities and an explanation of why these entities would not provide funding; and
5. The required amount of a grant or subsidy that would be needed to feasibly implement the BMP if financing or partnerships could not be obtained.

environmental constraints

Document the critical environmental issues and known (qualitative and/or quantitative) negative impacts of the BMP and an explanation of why effective mitigation of these impacts is not possible. If mitigation of the environmental impacts is possible, the practice must be implemented unless it can be exempted by another exemption category. For example, if the mitigation costs make the project economically infeasible, a discussion of the mitigation plan and necessary mitigation costs should be included as a part of the economic analysis.

legal constraints

Detail the following:

1. A list of any known laws, regulations, court decisions, or other legal constraints that make it illegal for the District to implement the BMP; and
2. A list of the steps that would be required to remove these constraints; and
3. A description of what steps the District has taken to remove these constraints; and
4. Documentation of efforts by the District to work with other entities that would have the legal authority to carry out the BMP within the District's service area.

Attachment B
Non-Applicability (N/A) of Exemptible BMPs

To establish that a BMP is not applicable to the District, the Plan should explain the reasons why the BMP does not apply to the District. This justification must be consistent with Step 1 of the Criteria titled, "Describe the District." Examples of non-applicability for each exemptible BMP are listed below. This list is not all inclusive.

Step 4, B. Exemptible Best Management Practices for Municipal and Industrial Contractors

1. **Interior and exterior water audits and incentive programs for single family residential, multifamily residential, and governmental/institutional customers** - None identified.
2. **Plumbing, new & retrofit** - NA could include: districts which supply water only to structures which have no plumbing fixtures or supply water only for exterior uses.
3. **Large landscape water audits and incentives** - NA could include: districts which do not supply water to any landscape of three acres or more.
4. **Commercial, industrial and institutional conservation** - NA could include: districts which provide water only to residential customers.
5. **Landscape water conservation for new and existing single family** homes - NA could include: districts which provide no water to residential customers.
6. **Ultra low flush toilet replacement** - None identified

M&I WATER
ACCOUNTING TABLES

Table 1

1996 - Surface Water Supply

Month	USBR M&I acre-feet	State project acre-feet	Local Water Supply acre-feet	other acre-feet	Total acre-feet
January					
February					
March					
April					
May					
June					
July					
August					
September					
October					
November					
December					
TOTAL					

Transfer the Total Surface Water Supply to Table 3

Water District Name - M&I Suppliers ONLY

Table 2

1996 - Ground Water Supply

Month	Pumped by District			Pumped by District Customers			Total
	Basin 1 acre-feet	Basin 2 acre-feet	Basin 3 acre-feet	Basin 1 acre-feet	Basin 2 acre-feet	Basin 3 acre-feet	acre-feet
January							
February							
March							
April							
May							
June							
July							
August							
September							
October							
November							
December							
TOTAL							

Transfer the Total Ground Water Supply to Table 3

Water District Name - M&I Suppliers ONLY

Table 3

1996 - Water Supplies

Month	Surface Water acre-feet	Ground Water acre-feet	Effective Precipitation acre-feet	Reclaimed Water acre-feet	Other acre-feet	Total acre-feet
January						
February						
March						
April						
May						
June						
July						
August						
September						
October						
November						
December						
TOTAL						

Transfer the Total Water Supply to Table 6

Table 4

1996 - Conveyance Losses

Area or line	**Length** miles	**Leaks** acre-feet	**Breaks/spills** acre-feet	**Flushing/fire** acre-feet	**Total Losses** acre-feet
TOTAL					

Transfer the Total Conveyance Losses to Table 6

Water District Name - M&I Suppliers ONLY

Table 6

1996 - Overall Water Budget

Step 2 A **1996 Water Supply**	Table 3		_____
District Beneficial Uses			
Environmental Consumptive Use		minus	_____
Ground Water Recharge	(planned)	minus	_____
Water Exchanges or Transfers		plus or minus	_____
Distribution System flushing / fire	Table 4	minus	_____
WATER SUPPLY AVAILABLE FOR USE			_____
District Non-Beneficial Uses			
Distribution System Leaks	Table 4	minus	_____
Distribution System - breaks / spills	Table 4	minus	_____
WATER SUPPLY AVAILABLE FOR SALE			_____
Actual Water Sales			_____
Inside Use	(estimate)	minus	_____
Landscape / Outside Uses	(calculated)		_____

Table 7

Ocean Discharge of Treated Waste Waster

	1996
Total waste water discharged directly to ocean	AF

Table 8

Annual Water Quantities Delivered Under Each Right or Contract

Year	USBR M & I	SWP (Contract)	Local Water Supply	TOTAL
1987				
1988				
1989				
1990				
1991				
1992				
1993				
1994				
1995				
1996				
Total				
Average				

Water District Name - M&I Suppliers ONLY

AGRICULTURAL AND M&I
WATER MANAGEMENT
PLAN FORMAT

Step 1. Description of the District

Some data called for in these Criteria may not be available.
Include in the plan how the District will gather those data and have them available for the next plan update.

A. History

Date District formed: _____ Original Size _____

Size & Irrigated Acres

	size (sq. miles)	population served	irrigated acres
Size at first USBR contract			
Size in 1976			
Size in 1986			
Size in 1996			

Water Supplies

Water Source	1976 AF	1986 AF	1996 AF
USBR M&I water			
USBR Irrigation water			
state project water			
other imported water			
local surface water			
upslope drain water			
District groundwater			
private groundwater (est.)			
transferred water			
reclaimed water			
other			
TOTAL			

Contract Information

	date	AF	AF	AF
First USBR contract		AG	M&I	Other
Contract renewal		AG	M&I	Other
1996 Information		AG	M&I	Other

Provide the annual entitlement under each right and/or contract.

source	AFY	contract #	contract restrictions
USBR			

Describe anticipated land use changes (agricultural to municipal, etc.)

_____

_____

_____

Cropping Patterns

List crops with 5% or more of total acreage - Select from attached crop list (page 34).

1976	acres	1986	acres	1996	acres
misc. (<5%)		misc. (<5%)		misc. (<5%)	
TOTAL		TOTAL		TOTAL	

Evolving Irrigation Methods

List the five major irrigation methods (by acreage) - Select from attached list (page 34).

1976	acres	1986	acres	1996	acres
all other		all other		all other	
TOTAL		TOTAL		TOTAL	

List the acreage of vegetable-germination irrigation methods used in the District

1986	acres	1996	acres
sprinkler		sprinkler	
cut length of run - 660 feet		cut length of run - 660 feet	
cut length of run - 330 feet		cut length of run - 330 feet	
gated pipe		gated pipe	
(?)		(?)	
TOTAL		TOTAL	

B. Location and Facilities

Agricultural conveyance system

miles unlined - canal	miles lined - canal	miles piped	miles - other

Municipal distribution system

miles AC pipe	miles steel pipe	miles cast iron pipe	miles - other

Storage

Describe the District's storage facilities (reservoirs, regulating reservoirs, etc.), including capacity & location.

_____

_____

_____

Spill Recovery System

Describe the District's spill recovery system.

_____

_____

_____

Delivery System Operation

Describe whether the delivery system provides immediate, scheduled, rotation, or other delivery method.

_____

_____

Describe any restrictions on the District's water source(s).

restriction	agency imposing restriction	effect on District operations

Proposed changes or Additions to District Facilities and Operations for 1997-2002.

_____

_____

_____

C. Topography and Soils

Describe the topography (e.g. hilly, flat, sloping to a water course) of the District. Discuss any impact of topography on District water management.

Soils

Provide District soil associations (contact NRCS for information).

soil association	est. acres	effect on water operations and management

Describe any limitations resulting from soil problems (e.g., salinity or high water table, sandy soils, low infiltration rates, etc.).within the District.

soil problem	est. acres	effect on water operations and management

D. Climate

Describe the general climate of the District (available from National Weather Service, etc.).

For weather data, specify the period of record (30 years recommended) and reference used.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
avg precip													
avg temp													
max temp													
min temp													

average wind velocity: _____ average wind direction _____

average annual frost free days: _____

Describe the impact of any microclimates on water management within the District.

_____

_____

_____

E. Natural and Cultural Resources

Natural Resources within the District.

name	est. acres	description
sandy beach rapids	*200*	*spawning area* (example)

Indicate any management of these resources in the past or present by the District.

_____

_____

Recreational and/or Cultural Resources

name	est. acres	description
Chumash village site	*50*	*river terrace with numerous house sites* (example)

F. Operating Rules and Regulations

Describe the District's agricultural water allocation policy.

_____

_____

_____

Provide the official and actual lead times necessary for water orders and shut-off.

_____

_____

Describe the District's return-flows and drainage policies.

Describe the District's policies on water transfers by the district and it's customers.

G. Water Measurement and Accounting Procedures

Agricultural Customers

total # of customers _____ total # of measured customers _____

total # of customer turnouts _____ total # of measured turnouts _____

Provide the number of each type of measurement device used by the District and maintenance schedule

type	number	accuracy (percentage)	reading (days	calibration (months	maintenance (months)
orifices					
propeller meters					
weirs					
flumes					
venturi meters					
pump, run time					
pump, KWH					
TOTAL					

Municipal Customers

total # of customers _____ total # of measured customers _____

total # of unmeasured customers _____

type	number	accuracy (percentage)	reading (days)	calibration (months)	maintenance (months)
M & I meters - 5/8-3/4"					
M & I meters - 1"					
M & I meters - 1 1/2"					
M & I meters - 2"					
M & I meters - 3"					
M & I meters - 4"					

M & I meters - 6"					
M & I meters - 8"					
M & I meters - 10"					
Compound					
Turbo					
Other					
Other					
TOTAL					

Describe the District's water-use data accounting procedures, including how records are kept and archived, availability of water use data to customers, and how many years of customer water use records are available.

Describe the District's agriculture water charges (include per-acre assessments, stand-by changes, quantity charges, etc.), and dollar amounts. If water use is billed by quantity describe the rate structure (e.g., declining, uniform or increasing block).

Describe the District's municipal water charges - include dollar amounts for stand-by and quantity charges. If water use is billed by quantity describe the rate structure (e.g., declining, uniform or increasing block).

H. Water Shortage Allocation Policies

Describe (or attach) District's water shortage policies that include how reduced water supplies and hardship water are allocated.

agricultural:

municipal:

Describe (or attach) District policies that address wasteful use of water. Include information on enforcement methods.

Step 2. Inventory Water Resources

Some data called for in these Criteria may not be available.
Include in the plan how the District will gather those data and have them available for the next plan update.

A. Surface Water Supply

Acre-foot amounts of surface water delivered to the District by each of the District's sources
Complete Table 1, Page Tables - Page 1
Provide the amount of water received under each right and/or contract for the last 10 years
Complete Table 8, Page Tables - Page 8

B. Ground Water Supply

Describe any ground water basin(s) that underlie the District

name	size (sq. mi.)	usable capacity (AF)	safe yield (AFY)

Provide a map locating District operated wells, and managed ground water recharge areas

If there is conjunctive use of surface & ground water, describe it.

_____

_____

_____

_____

For managed ground water basins, attach a copy of the management plan

C. Other Water Supplies

Describe District long-term water supplies not described above.

source	amount (AFY)	length of contract	use
TOTAL			

D. Source Water Quality Monitoring Practices

Describe any surface water or ground water quality problems, and how the quality problems limit the use of the water or affect customer use decisions

Describe any water quality monitoring programs for surface water.

analyses performed	concentrations		frequency
	range	average	

Describe any water quality monitoring programs for ground water.

analyses performed	concentrations		frequency
	range	average	

Identify which agencies conduct the water testing and describe the District's role in program

_____

_____

_____

E. Water Uses within the District

1. Agricultural

Provide information on crops grown in 1996 (cultivated on 5 percent or more of the 1996 total irrigated acreage) and their acreages.

crop name: _____

irrigation methods acreage

_____

_____

_____

crop name: _____

irrigation methods acreage

_____

_____

_____

crop name: _____

irrigation methods acreage

_____

_____

crop name: _____

irrigation methods acreage

crop name: _____

irrigation methods acreage

Summarize types of irrigation systems (methods) used in the district (1996).

irrigation methods acreage

2. Municipal and Industrial:

Customer type	# of Connections	1996 use (AF)
Single Family		
Multifamily		
Commercial		
Industrial		
Public Agency		
M&I Irrigation		
Wholesale		
Construction		
Reclaimed		
Other (specify)		
Unaccounted for		
TOTAL		

M&I Waste Water Collection & Treatment Systems serving the entire District service area

treatment plant	treatment level (1, 2, 3)	1996 (AF)	disposal to:
	TOTAL		
Total discharged to ocean /	saline sink		

M&I Reclaimed Water

treatment plant	treatment level (1, 2, 3)	1996 (AF)	types of users:
	TOTAL		

3. Ground Water Recharge

Describe any District operated ground water recharge areas (as identified in Step 2B).

Recharge Area	Method of recharge	1991 recharge (AF)	1996 (AF)
	TOTAL		

4. Transfers and Exchanges

Transfers refer to water exchanges, sales or other agreements that transfer or exchange water between water users, such as: 1) agriculture to M & I, 2) M & I to agriculture, and 3) agriculture to agriculture. For transfers within District, list agriculture to M & I and M & I to agriculture transactions.

from whom	to whom	1989 (AF)	1991 (AF)	1996 (AF)	Use
TOTAL					

For transfers into or out of the District, list all transactions.

from whom	to whom	1989 (AF)	1991 (AF)	1996 (AF)	Use
TOTAL					

Describe any trades, wheeling or other transactions.

5. Other

Other uses	1989 (AF)	1996 (AF)
TOTAL		

F. Drainage from the District

Identify, to the extent possible, where surface and subsurface return flows go.

If return flows leave the District's service area and are reused, identify the location and type of that reuse, if known.

location of reuse	type of reuse	1991 (AF)	1996 (AF)
TOTAL			

Describe any drainage water quality testing program.

analyses performed	concentrations		frequency
	range	average	

Describe the District's role in the drainage testing program.

Describe any usage limitation resulting from the drainage water quality

constituent	usage limitation

G. ***Water Accounting*** (Inventory)

1. ***Quantify District Water Supplies***
   To complete this section enter the necessary data in the listed Tables.
2. ***Quantify Water Used***
   To complete this section enter the necessary data in the listed Tables.
3. ***Overall Water Inventory:*** Compare total water supplies entering the District with total water leaving the District. (Table 6)

Step 3. Best Management Practices for Agricultural Contractors

The forms for Step 3 are not designed to provide fill-in space for all of the necessary information. The fill-in spaces provided are considered essential "starting" information and the District's plan should include appropriate additional information.

A. Critical Best Management Practices for Agricultural Contractors

1. Measure, with a device that is rated to have a maximum error of ± six percent, the volume of water delivered by the District to each customer

total # of unmeasured customer turnouts _____

number of measurement devices installed in 1996 _____

number of measurement devices installed in 1997 _____

number of measurement devices to be installed in 1998 _____

types of measurement devices to be installed	accuracy	total to be installed

2. Adopt a water pricing structure for District water users based at least in part on quantity delivered

If a water pricing structure based in part on quantity delivered is not in place, describe the proposed or newly adopted quantity based water pricing structure and when it was or will be implemented.

_____

_____

_____

_____

_____

3. Designate staff responsible for development and implementation of the water management plan.

Name _____ Title _____

Address _____

Telephone _____ Fax _____ E-mail _____

4. ***Provide or support the availability of the following water management services for water users:***

a. ***On-farm irrigation and drainage system evaluations (e.g., Mobile Labs)***

Total number of irrigated acres:	
Number of irrigated acres to be surveyed per year by on-farm irrigation evaluations:	
Total number of farms:	
Number of farms to be surveyed per year by on-farm irrigation & drainage evaluations:	

Describe the extent to which District on-farm irrigation and drainage system evaluation recommendations are implemented by growers.

b. ***Normal year and real-time irrigation scheduling and crop ET information (e.g., CIMIS)***

Describe the District's irrigation scheduling assistance program, including methods of data dissemination, and list any cooperating agencies.

c. ***Surface, ground and drainage water quantity and quality data***

Describe the District's surface, ground and drainage water quality monitoring program, including methods of data dissemination, and list any cooperating agencies.

*d. **Educational programs and materials for farmers, staff, and public***

Describe the District proposed or supported educational programs and their goals. Attach the materials used in these programs.

program	co-funders	goals

B. Exemptible Best Management Practices for Agricultural Contractors

1. ***Distribution system lining/piping*** - line or pipe distributions systems to increase distribution system flexibility and capacity, decrease maintenance and reduce seepage

canal/ditch (reach)	unlined/ lined	# of miles in reach	est. seepage (AFY)

2. ***Construct or line regulatory reservoirs*** - construct regulatory reservoirs to improve distribution system delivery flexibility.

reservoir name	annual spill in section (AFY)	est. spill recovery (AFY)

3. ***Distribution control*** - modify distribution facilities and controls to increase the reliability, consistency and flexibility of water deliveries

Estimate annual operation spills. Identify locations for automated canal structures and other distribution system improvements. Estimate annual water savings (AFY) resulting from the evaluated projects.

4. ***Reuse systems*** - construct facilities to capture and reuse District operational spills

lateral	annual spill (AFY)	est. spill recovery (AFY)

5. ***Incentive pricing*** - implement a pricing structure, such as tiered-block pricing, which promotes one or more of the following goals: a) encouraging more efficient water use at the farm level, b) supporting planned conjunctive use of groundwater, c) increasing groundwater recharge, d) reducing problem drainage, and e) improved management of environmental resources

6. **On-farm program incentives** - facilitate and/or provide financial incentives and assistance for improved on-farm water management

Identify District programs to facilitate and/or provide financial incentives for improved on-farm water management. Include information on the estimated amount of yearly loans.

7. ***Conjunctive use*** - increase planned conjunctive use of surface/groundwater within District

Describe the potential for increased conjunctive use and identify programs to achieve this potential.

8. ***Land management*** - facilitate alternative uses for lands with exceptionally high water duties, or whose irrigation contributes to significant problems

Drainage Characteristic	acreage	potential alternate use
High water table (<5')		
Poor drainage		
GW Se Concentration > 50 ppb		
Poor productivity		

9. ***Pump efficiency evaluations*** - coordinate the evaluation of District and private pumps with local utilities, evaluating both energy and water efficiency

Describe the pump efficiency evaluation program and the role of the District and participating local utilities in the program.

10. ***Operational practices and procedures*** - evaluate potential District, state and federal policy and institutional changes that could allow more flexibility in water delivery and carry-over storage.

Identify District policies that limit improved end-user water management.

Describe actions the District can take to overcome these limitations.

Step 4. Best Management Practices for Municipal and Industrial Contractors

The forms for Step 3 are not designed to provide fill-in space for all of the necessary information. The fill-in spaces provided are considered essential "starting" information and the District's plan should include appropriate additional information.

A. Critical Best Management Practices for Municipal and Industrial Contractors

1. Distribution system water audits, leak detection and repair

Describe the districts current or planned distribution system water audit, and leak detection/repair program. If this BMP is not on-going, include a time schedule and yearly budget to implement this program system wide at regular intervals.

2. Metering with commodity rates for all new and existing connections

Describe the districts current or planned program to meter and bill by quantity all new and existing customers. If this BMP is not complete, include a time schedule and yearly budget to achieve 100 percent metering and commodity billing.

3. Landscape efficiency requirements for new/existing commercial, industrial, institutional, governmental and multi-residential developments.

Describe the districts current or planned efficient landscape ordinance or regulations. If this BMP is not complete, include a time schedule and budget necessary to adopt and implement the regulations.

4. Public information

Describe the districts current or planned program to promote water-use efficiency to the District's customers. If this BMP is not on-going, include a time schedule and yearly budget that will result in an effective public information program.

5. *School education*

Describe the districts current or planned program to conduct water conservation education in schools within the District. If this BMP is not on-going, include a time schedule and yearly that will result in an effective program with broad impact.

6. *New commercial, industrial and institutional (CII) water use review*

Describe the District' current or planned program to assist CII customers to be water efficient. If this BMP is not on-going, include a time schedule and yearly budget that will result in New CII customers receive this assistance.

7. *Conservation pricing - water and sewer service*

Describe the districts current or planned program to promote efficient water-use through an incentive pricing structure. If this BMP is not complete, include a time schedule and yearly budget necessary to design and adopt an incentive pricing program for water and sewer service.

8. *Water waste prohibition*

Describe the districts current or planned waste water prohibitions. If this BMP is on-going, include a time schedule and budget necessary to achieve adopt and enforce waste water regulations.

9. *Demand management staff*

Identify the District's staff member responsible for development and implementation of the USBR Water Conservation Plan.

10. *Financial incentives*

Describe the incentives offered by the District to insure that the BMPs are effective implemented by the District's customers.

B. Exemptible Best Management Practices for Municipal and Industrial Contractors

1. *Interior and exterior water audits and incentive programs for single family residential, multi family residential, and governmental/institutional customers*

Current Program- describe audit components, method of program promotion, incentives offered to reach implementation target, etc.

Identification of potential specific program designs- include types of audits, incentives considered, etc.

Evaluation of specific designs- include factors which determined specific program design selected

Description of specific program - include program goals, budget and how results will be monitored

2. ***Plumbing, new & retrofit*** - Implement programs to retrofit ULF toilets and/or high efficiency showerheads in existing buildings.

Current Program- identify number of customers, method of program promotion, incentives offered to reach implementation target, number of customers retrofitted, etc.

Identification of potential specific program designs- include types of incentives, devices considered, etc.

Evaluation of specific designs- include factors which determined program design selected by District

Description of District's program - include program goals, budget and how results will be monitored

3. Large landscape water audits and incentives

Current Program- identify number of large landscapes, method of program promotion, incentives offered to reach implementation target, number of landscapes audited each year, etc.

Identification of potential specific program designs- include types of promotion and incentives, etc.

Evaluation of specific designs- include factors which determined program design selected by District

Description of District's program - include program goals, budget and how results will be monitored

4. Commercial, industrial and institutional conservation - Conduct commercial and industrial water conservation audits, water use reviews, and incentive programs for existing customers.

Current Program- total number of CII customers and number of CII audited each year and total to date, method of program promotion, yearly target and incentives offered to reach target, results, etc.

Identification of potential specific program designs- include types of promotion and incentives, etc.

Evaluation of specific designs- include factors which determined program design selected by District

Description of District's program - include program goals, budget and how results will be monitored

5. ***Landscape water conservation for new and existing single family homes*** - Provide landscape water conservation audit and incentive programs for new and existing customers.

Current Program- number of single family customers and number audited each year and total to date, method of program promotion, yearly target and incentives offered to reach target, results, etc.

Identification of potential specific program designs- include types of promotion and incentives, etc.

Evaluation of specific designs- include factors which determined program design selected by District

Description of District's program - include program goals, budget and how results will be monitored

6. *Ultra low flush toilet installation program*

Current Program- projected number of non-ULF toilets and total installed to date, method of program promotion, yearly target and incentives offered to reach target, results, etc.

Identification of potential specific program designs- include types of promotion and incentives, etc.

Evaluation of specific designs- include factors which determined program design selected by District

Description of District's program - include program goals, budget and how results will be monitored

Step 5. Exemption Process

BMP considered for exemption: _____ Applicability (see Appendix B)

Proposed reason for exemption: _____

cost-effectiveness

Include or attach a benefit-cost analysis which demonstrates that the costs to the District outweigh the benefits to the District over the life of the measure. Perform the analysis by comparing the present value of all benefits to the present value of all costs. Document the projected/estimated benefits and costs and the methodology for analysis (benefits and costs should be quantified to the extent possible). Perform the analysis from the District perspective and include al least the benefits and costs listed in the September 1996 *Criteria for Evaluating Water Management Plans*

financial feasibility

Document the following:

1. The benefits and costs of the BMP to the District; and
2. The District funding needed to implement the cost-effective BMPs; and
3. A discussion regarding why the District cannot finance the BMP through rate adjustments, assessments, etc.; and
4. A discussion of the District's reasonable efforts to secure funding from other entities which include, but are not limited to, lending institutions and bonding authorities and an explanation of why these entities would not provide funding; and
5. The required amount of a grant or subsidy that would be needed to feasibly implement the BMP if financing or partnerships could not be obtained.

environmental constraints

Document the critical environmental issues and known (qualitative and/or quantitative) negative impacts of the BMP and an explanation of why effective mitigation of these impacts is not possible. If mitigation of the environmental impacts is possible, the practice must be implemented unless it can be exempted by another exemption category. For example, if the mitigation costs make the project economically infeasible, a discussion of the mitigation plan and necessary mitigation costs should be included as a part of the economic analysis.

legal constraints

Detail the following:

1. A list of any known laws, regulations, court decisions, or other legal constraints that make it illegal for the District to implement the BMP; and
2. A list of the steps that would be required to remove these constraints; and
3. A description of what steps the District has taken to remove these constraints; and
4. Documentation of efforts by the District to work with other entities that would have the legal authority to carry out the BMP within the District's service area.

Attachment A
Information required of Districts located in the drainage problem area

District's included in the drainage problem area, as identified in *A Management Plan for Agricultural Subsurface Drainage and Related Problems on the Westside San Joaquin Valley (September 1990),* are listed, by sub-area, below. If future editions of the drainage report revise the boundaries of the drainage problem area or other factors used to determine which districts are in the drainage problem area, Reclamation will revise Attachment A to conform with the current drainage report.

1. Reclamation districts in the **Grasslands Subarea**: Broadview WD, Central California ID, Del Puerto WD, Firebaugh Canal WD, Mercy Springs WD, Pacheco WD, Panoche WD, San Luis Canal Company, San Luis WD.

2. Reclamation districts in the **Westlands Subarea**: James ID, Tranquillity ID and Westlands WD.

3. Reclamation districts in the **Tulare Subarea**: Alpaugh ID, Atwell Island WD, Lower Tule River ID, and Pixley ID.

4. Reclamation districts in the **Kern Subarea**: Alpaugh ID.

Districts listed above shall describe which recommendations prescribed in *A Management Plan for Agricultural Subsurface Drainage and Related Problems on the Westside San Joaquin Valley (September 1990)* have been incorporated in their water conservation programs to improve conditions in drainage problem areas. These recommendations include:

1. Source Control
2. Land Retirement
3. Drainage Water Treatment
4. Drainage Water Reuse
5. Shallow Groundwater Pumping
6. Evaporation Ponds

Provide a description and level of expenditure for each activity designed to address the recommendations of the San Joaquin Valley Drainage Program. Identify how implementation of the recommendations has or will substantially reduce deep percolation on drainage problem lands. Describe which recommendations have not been implemented and why.

Attachment B
Non-Applicability (N/A) of Exemptible BMPs

To establish that a BMP is not applicable to the District, the Plan should explain the reasons why the BMP does not apply to the District. This justification must be consistent with Step 1 of the Criteria titled, "Describe the District." Examples of non-applicability for each exemptible BMP are listed below. This list is not all inclusive.

Step 3, B. Exemptible Best Management Practices for Agricultural Contractors

1. **Distribution system lining/piping** - NA could include: completely piped systems, unlined systems or sections of systems which are used as part of a planned conjunctive use program;
2. **Regulatory reservoirs** - NA could include: completely piped systems which do not have delivery constraints;
3. **Distribution control** - NA could include: completely piped systems which do not have delivery constraints;
4. **Reuse systems** - NA could include: completely piped systems which do not have delivery constraints;
5. **Incentive pricing** - None identified;
6. **On-farm program incentives** - None identified;
7. **Conjunctive use** - NA could include: districts which do not overlie a useable ground water basin and thus neither the district nor its customers pump or use ground water;
8. **Land management** - NA could include: districts without irrigable lands that have exceptionally high water duties or whose irrigation does not contribute to significant problems;
9. **Crop & field** - NA could include: districts where are least 50 percent of the customers irrigate crops with non-district water;
10. **Pump efficiency evaluations** - NA could include: districts where neither the district nor its customers use ground water pumps, lift pumps, pressure pumps, filter pumps, etc.;
11. **Operational practices and procedures** - None identified.

Attachment C

Crop List

barley
corn - field
oats
rice
sorghum
wheat
other cereals

alfalfa
clover
irrigated pasture
other hay
silage
other forage

cotton
hops
safflower
sugar beats
soybeans
other field crops

asparagus
beans
broccoli

cabbage
carrots
cauliflower
celery
corn
cucumbers
garlic
greens
lettuce
melons
onions
peas
peppers
potatoes
squash
tomatoes
other vegetables

Sudan grass
Bermuda grass
other grasses

apples
apricots
avocados

berries (all kinds)
cherries
grapefruit
lemon / limes
oranges / tangerines
dates
grapes
olives
peaches
pears
prunes / plums
strawberries
other fruits

almonds
pecans
pistachios
walnuts
other nut trees

ornamental nursery
joboba
other

Irrigation Methods List

Level Basin, 1/4 mile
Level Basin, 1/8 mile
Graded, surface 1/2 miles
Graded, surface 1/4 miles
Graded, surface 1/8 mile
Sprinkler, center pivot
Sprinkler, linear move
Sprinkler, solid set
Sprinkler, hand move
Trickle, spray
Trickle, subsurface
Trickle, surface

AGRICULTURAL AND M&I
WATER ACCOUNTING TABLES

Table 1

1996 - Surface Water Supply

Month	USBR Agric. acre-feet	USBR M&I acre-feet	State Project acre-feet	Local Water Supply acre-feet	Upslope Drain / Spill acre-feet	Total acre-feet
January						
February						
March						
April						
May						
June						
July						
August						
September						
October						
November						
December						
TOTAL						

Transfer the Total Surface Water Supply to Table 3

Water District Name (Suppliers to both Ag and M&I)

Table 2

1996 - Ground Water Supply

Month	Pumped by District			Pumped by District Customers			
				Agricultural			
	Basin 1 acre-feet	Basin 2 acre-feet	Basin 3 acre-feet	Basin 1 acre-feet	Basin 2 acre-feet	Basin 3 acre-feet	Total acre-feet
January							
February							
March							
April							
May							
June							
July							
August							
September							
October							
November							
December							
TOTAL							

Transfer the Total Ground Water Supply to Table 3

Table 3

1996 - Water Supplies

Month	Surface Water acre-feet	Ground Water acre-feet	Effective Precipitation acre-feet	Reclaimed Water acre-feet	Other acre-feet	Total acre-feet
January						
February						
March						
April						
May						
June						
July						
August						
September						
October						
November						
December						
TOTAL						

Transfer the Total Water Supply to Table 6

Table 4

1996 - Conveyance Losses

Reach or Lateral Area or Line	**Length** miles	**Seepage** (canals) - acre-feet	**Evaporation** acre-feet	**Leaks** (pipes) - acre-feet	**Spills/Breaks** acre-feet	**Flushing/fire** acre-feet	**Total Losses** acre-feet
TOTAL							

Transfer the Total Conveyance Losses to Table 6

Table 5

1996 - Crop Water Needs

Crop	Area crop acres	Growing Season Planting month	 Harvest month	Crop ET AF per acre	Leaching + Requirement AF per acre	Cultural + Practices AF per acre	Crop = Water Needs acre-feet
all other misc. crops							
TOTAL Crop Acres							

Total Irrigated Acres _____ (Due to double cropping Total irrigated Acres is usually less than the Total Crop Acres)

Transfer the Total Crop Water Needs to Table 6

Table 6

1996 - Overall Water Budget

Step 2 A **1996 Water Supply**		from Table 3	_____
District Beneficial Uses			
Environmental Consumptive Use		minus	_____
Ground Water Recharge	(planned)	minus	_____
Distribution System Other - flushing / fire	Table 4	minus	_____
Water Exchanges or Transfers		plus or minus	_____
		WATER SUPPLY AVAILABLE FOR USE	_____
District Non-Beneficial Uses			
Conveyance System Seepage	Table 4	minus	_____
Canal / Lateral / Reservoir Evaporation	Table 4	minus	_____
Conveyance System Spills	Table 4	minus	_____
Distribution System Leaks	Table 4	minus	_____
Distribution System Breaks	Table 4	minus	_____
Consumptive Use by Riparian Vegetation	(estimate)	minus	_____
		WATER SUPPLY AVAILABLE FOR SALE TO CUSTOMERS	_____
		ACTUAL AGRICULTURAL WATER SALES	_____
Crop Water Needs	Table 5	minus	_____
On-farm Drain/Spill Leaving District	(estimate)	minus	_____
Deep Percolation	(calculated)	EQUALS	_____
		ACTUAL M&I WATER SALES	_____
M&I Inside Use	(estimate)	minus	_____
M&I Landscape / Outside Use	(estimate)	minus	_____

Water District Name (Suppliers to both Ag and M&I)

Table 7

Deep Percolation and Conveyance Seepage
Ocean Discharge of Treated Waste Waster

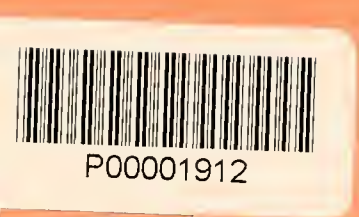
	1996 acre-feet or acres
Deep Percolation (Table 6)	AF
Conveyance Seepage (Table 4)	AF
Total of Deep Percolation + Conveyance Seepage	AF
Irrigated acres	acres
Irrigated acres over a perched water table	acres
Irrigated acres over a saline sink	acres
Portion of Deep Percolation / Conveyance Seepage flowing to a perched water table	AF
Portion of Deep Percolation / Conveyance Seepage flowing to a saline sink	AF
Total (AF) flowing to a perched water table or saline sink	**AF**
Total waste water discharged directly to ocean	**AF**

Table 8

Annual Water Quantities Delivered Under Each Right or Contract

Year	USBR			SWP	Local Water	TOTAL
	Class I	Class II	M & I	(Contract)	Supply	acre-feet
1987						
1988						
1989						
1990						
1991						
1992						
1993						
1994						
1995						
1996						
Total						
Average						

Water District Name (Suppliers to both Ag and M&I)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